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WASAARADDA WAXBARASHADA IYO BARBAARINTA
XAFIISKA MANAAHIJTA
MUQDISHO — 1983

Buuggan lama daabacan karo lamana guurin karo iyadoo
aan Wasaaradda Waxbarashada iyo Barbaarinta laga helin oggolaansho

Waxa lagu daabacay Madbacadda Qaranka
Xamar — 1983

HORDHAC

Buuggan waxa loogu tala galay ardayda ku jirta Fasalka Siddeedaad ee Dugsiyada Aasaasiga ah. Ardayda buuggan loo qoray waxa ay dhammaysanayaan waxbarashadoodii khasabka, waxayna kaga faa'iidaystaan imtixaanka shahaadada dugsiyada aasaasiga, sidaa darteed waxa buuggan ku jira cutub naqtiin ah oo koobaya manhajyadii afarta sano ee dambe ee dugsiyada aasaasiga ah.

Buuggu waxa uu ka kooban yahay lix cutub oo kala ah Aljebra, Qiime Sugan, Kulanno Sallax, Tirignoomrteri iyo Layli Guud. Buugga waxa asalkiisii qoray Jaalle Xasan Daahir Obsiiye, Saciid Cige Aaden, Maxamed Cali Maxamed, Maxamed Cumar Dubbad iyo Cismaan Jaamac Daahir, waxa saxay kana saaray qaladyadii daabacaadda Jaalle Cumar Sheekh Cali Ducaale. Dhammantood waa ay mahadsan yihiin. Waxa kale oo aan mahad u noqaynaa Jaalle Cabdi Xirsi Qanyare oo buuggan qaraacay asalkiisii iyo Xasan Sallaam Axmed oo Sawirrada u sameeyey iyo Alla ha u naxariistee Marxuum Idriis Maxamuud Cabdillaahi oo naqshadda Jaldiga sameeyey.

Waxa kale oo mahad gaar ah mudan Madaxda iyo Shaqaalaha Wakaaaladda Madbacadda Qaranka oo suurageliyey soo bixidda buuggan.

Maamulaha Xafiiska Manaahijta
Xasan Daahir Obsiiye

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CUTUB I

ISIREYN

(Nakhtiin)

Haddii aynu rabno inaynu raadinno isir weynaha ay wadaagaan (I.W.W.) labada haltibix ee $24x^2y$ iyo $18xy^2$, waxaynu horta raadinnaa isir weynaha ay wadaagaan (I.W.W.) weheliyeyaashu. I.W.W. 24 iyo 18 waxa weeye 6. Doorsoomayaashana waxa I.W.W. u ah xy. Markaa I.W.W. labada haltibix waxa weeye taranta 6 iyo xy oo ah 6xy. Markaa haltibix wata weheliyaha ugu weyn iyo doorsoomaha leh heerka ugu weyn una ah isir dhowr haltibix ayaa ah I.W.W. dhowrka haltibix.

Bal hadda u fiirso tibxaalaha $15ab + 12a$. Haddii aynu adeegsanno xeerka kala dhigga iskudhufashada ee isu-geynta waxaan heli karnaa:

$$15ab + 12a = 3a\,(5b + 4)$$

3a waa haltibix, 5b + 4na waa tibixaale. Markaa 3a waxa weeye isir haltibix ah oo uu leeyahay tibixaalaha $15ab + 12a$. Isir weynaha haltibixa ah ee ay wadaagaan tibxaha 15ab iyo 12a ee tibixaalaha $15ab + 12a$ wuxuu yahay 3a.

Haddii la ina siiyo tibixaale oo la inaga rabo inaynu raadinno isirradooda waa inaynu horta eegnaa inuu jiro haltibix ah isir ay wadaagaan tibxaha tibxaalahaasu. Waxaad ka soo qaadataa in la innaga rabo inaynu raadinno isirka ay wadaagaan tibixaha tibixaalaha $12x^3 + 36x^2 + 8x$. Si aynu u helno isirkaa, waa inaynu raadinnaa isir weynaha haltibixa ah ee ay wadaagaan tibxaha tibxaaluhu. Waxaynu arki karnaa isir weynaha haltibaxa aha ee ay wadaagaan tibixaha $12x^3 + 36x^2 + 8x$ inuu yahay 4x. Sidaa darteed,

$$12x^2 + 36x^2 + 8x = 4x\,(3x^2 + 9x + 2)$$

Waxa kale oo aynu naqaannaa sida loo raadiyo isirrada labatibixyada ah ee tibixaaleyaasha.

Tusaale:

Raadi isirrada $ax + by + ay + bx$.

Furfuris:

$ax + by + ay + bx = ax + bx + ay + by$

Xeerka kala hormarinta isugeynta.

$= (ax + bx) + (ay + by)$

Xeerka hormagelinta isugeynta.

$= x\,(a + b) + y\,(a + b)$

Xeerka kala dhigga iskudhufashada ee isugeynta.

$= (a + b)\quad (x + y)$

Xeerka kala dhigga iskudhufashada ee isugeynta.

Markaa $ax + by + ay + bx = (a + b)\quad (x + y)$

Ma raadin kartaa isirrada faraqa laba labajibbaar? Waa maxay isirrada $9x^2 - 25y^2$? Waa inaad markaad aragtid aad garan kartaa isirrada $9x^2 - 25y^2$ in ay yihiin $(3x + 5y)\quad (3x - 5y)$. Tibixaaleyaasha leh sansaanta $a^2 + 2ab + b^2$ ama $a^2 - 2ab + b^2$ waxaynu isirradooda ku heli karnaa innaga oo adeegsaneyna misaalladan:

$$(a + b)^2 = a^2 + 2ab + b^2$$

$$(a - b)^2 = a^2 - 2ab + b^2$$

Tusaale:

Raadi isirrada tibixaalaha $81x^2 + 90xy + 25y^2$

Furfuris:

Tibixda kowaad waa labajibbaarka 9x, ta saddexaadna waa labajibaarka 5y. Tibixda dhexe waxay u dhigantaa 2 (9x) (5y).

Markaa $81x^2 + 90xy + 25y^2 = (9x)^2 + 2\,(9x)\,(5y) + (5y)^2 = (9x + 5y)^2$

Layli:

I. Raadi isir weynaha ay wadaagaan:

1. x^3y^2; x^2y^3
2. $2x^2y$; $10xy^3$
3. $x^2 - h^2$; $x^2 - xh$
4. $4r^4n^3 + 2r^2n^5$; $3r^3n^4 - r^2n^2$
5. $x^3 - x^2$; $x^4 - 5x$

II. Raadi isirrada tibixaaleyaashan:

1. $3b^2 + 5b$
2. $d^2 + 2d + y^2d$
3. $8a^2 + 24b^2$
4. $a^2b + ab^2$
5. $dg + dm - fg - fm$
6. $2m\,(m - n) - (m + n)\,(m - n)$
7. $15n^2 - 20n - 12n^2 - 4$
8. $18x - 6 - 3x^3 - x^2$
9. $3b^2 + 2b + 12b + 8$
10. $2k^2 - 3k + 8k - 12$
11. $a^2 + ac + 4a + 4c$
12. $ab - by - ay + y^2$
13. $2a + 2x + ax + x^2$
14. $a^2 + 2ab + ab + 2b$
15. $a^3 - a^2 + a - 1$

III. Raadi isirrada

1) $a^2 - 64$
2) $25 - r^2$
3) $-d^2 - c^2$
4) $a^2\,b^2 - d^2$
5) $n^2 - 2n + 1$
6) $r^2 + 4r + 4$
7) $36y^2 - 24y + 1$
8) $8n + 8n^2 + 2n^3$
9) $16r^2 + 40rt + 25t^2$

Bal u fiirso sida ay saddextibixyo uga samaysmaan taranta labatibixyo.

$$(x + 9)\ (x + 2) = x^2 + 11x + 18$$
$$(x - 9)\ (x - 2) = x^2 - 11x + 18$$
$$(x + 9)\ (x - 2) = x^2 + 7x - 18$$
$$(x - 9)\ (x + 2) = x^2 - 7x - 18$$

Waxaad ka soo qaaddaa, haddaba, inaynu rabno isirro saddextibixyo la jaad ah kuwa isle'egyadani dhinacooda midig ka muuqda. Haddii aynu baadhbaadhno go'aannadan kore waxaynú arki inay:

1) Tibixda koowaad ee labada isirba tahay x.
2) Taranta tibixaha labaad ee isirradu ay le'eg tahay tibixda madoorsoomaha ah ee saddextibixa.
3) Wadarta tibixaha labaad ee isirradu ay le'eg tahay weheliyaha tibixda toosan ee saddextibixa.

Innaga oo saddexdaa hubaalood adeegsaneyna ayaynu isireyn karnaa saddextibixyada kuwa kor ku yaalla oo kale ah.

Tusaale:

Raadi isirrada $x^2 + 13x + 40$.

Furfuris:

1) Labada isir mid walba tibixdiisa koowaad waa inay noqotaa x.
2) Isirrada tibixahooda labaad waa inay noqotaa laba tiro oo tarantoodu tahay 40, wadartooduna tahay 13. Waxa kuu muuqan kara inay labada tiro yihiin 8 iyo 5.

Markaa $x^2 + 13x + 40 = (x + 8)(x + 5)$.

Layli:

1) $x^2 + 7x + 12$
2) $x^2 + x - 2$
3) $x^2 + 14x + 24$
4) $b^2 - 12b - 45$
5) $d^2 + 9d - 22$
6) $y^4 + 13y^2 - 48$
7) $y^2 - 45y - 46$
8) $t^2 - 15t + 54$
9) $96 - 4b - b^2$
10) $y^2 + 7y + 98y^2$

TABTA GUUD EE ISIREYNTA

Saddextibixyada Saableyda ah

Si loo raadiyo isirrada taranta saddextibix saableyah oo tibixdeeda saableyda ah wehelíyaheedu ka geddisan yahay 1, waxa laga yaabaa inaynu adeegsanno dhugasho iyo innaga oo kolba wax ku dayna.

Tusaale:

Raadi isirrada $3x^2 - 5x - 12$.

Ilaynta koowaad: Tibixda madoorsoomaha ahi waa tiro taban, tibixda toosanina way taban tahay.

Ilaynta labaad: Taranta labada tibixood ee toosan ee labatibixyadu waa $3x^2$. Taranta labada tibixood ee madoorsoomayaasha ah ee labatibixyaduna waa -12.

Inta siyood ee la tixgelin karaana waa kuwan:

Isirrada suuragalka ah	Tibixa toosan ee ku aaddan
1. $(x + 1)(3x - 12)$	$-12x + 3x = -9x$
2. $(x - 12)(3x + 1)$	$x - 36x = -35x$
3. $(x + 2)(3x - 6)$	$-6x + 6x = 0$
4. $(x - 2)(3x + 6)$	$6x - 6x = 0$
5. $(x + 4)(3x - 3)$	$-3x + 12x = 9x$
6. $(x + 3)(3x - 4)$	$-4x + 9x = +5x$
7. $(x - 4)(3x + 4)$	$4x - 12x = -8x$
8. $(x - 3)(3x + 4)$	$4x - 9x = -5x$

Ilaynta saddexaad: Tibixda toosan ee saddextibixu waa $-5x$.

Marka siddeeddan siyood tan ugu dambeysa ayuun baa waafaqsan saddexda ilaynba.

$$\therefore 3x^2 - 5x - 12 = (x - 3)(3x + 4)$$

Ilayn kale ayaa innaga caawin karta isirrada suuragalka ah dhimistooda. Ilayntaasu waxay tahay:

Haddii saddextibix aanu lahayn isir ay wadaagaan tibixihiisu, labatibixyada isirrada u ahna midkoodna ma yeelan karo isir ay wadaagaan labadiisa tixood.

Sidaa awgeed, ayaynu kolka ugu horreysaba aan tuuri karnaa labatibixyada $3x - 12$, $3x - 3$, $3x + 3$, $3x - 6$, iyo $3x + 6$. Maxaa yeelay mid kastaba wuxuu wataa isir wadaag aanu lahayn saddextibixa ay isirrada u yihiin.

Hilinkan aynu haddeer raacnay aad buu u dhib badan yahay waayo marmarka qaar-kood ayayna suuragal inoo ahayn inaynu helno inta siyood ee inna siin karta taranta labada madoorsoome ee labatibixyada si loo helo tibixda toosan. Sidaa awgeed, ayaa loogu baahan yahay in la raadiyo hilin kale oo aynu adeegsanno, marka saddextibixyada jaadkan ah aynu isireyneyno. Hilinka kale ee aynu raaci doonnaa wuxuu aad ugu dhaw yahay mid aynu awal raaci jirnay. Bal u fiirso tusaalahan soo socda:

Tusaale:

Raadi isirrada $4x^2 - 11x + 6$.

Furfuris:

1) Raadi taranta weheliyaha tibixda saableyda ah iyo ta madoorsoomaha ah. Waa 24.

2) Raadi labada tiro ee tarantoodu tahay 24, wadartooduna tahay -11. Halkaa waxaynu ka aragnaa in ay labada tiroba taban yihiin. Inta tiro (abyoonayaal ah) ee ay tarantoodu tahay 24 waa kuwan:

   $(24)(1)$, $(-24)(-1)$, $(12)(2)$, $(-12)(-2)$,

   $(6)(4)$, $(-6)(-4)$, $(8)(3)$, $(-8)(-3)$.

   Labada tiro ay tarantoodu tahay 24 wadartooduna tahay -11 waa (-8) iyo (-3).

3) Wàxaynu ku beddeli tibixda toosan

$4x^2 - 11x + 6 = 4x^2 - 8x - 3x + 6$,

Waayo $-11x = -8x - 3x$

4) Raadi isirrada tibaaxda $4x^2 - 8x - 3x + 6$

$4x^2 - 8x - 3x + 6$

$= 4x(x - 2) - 3(x - 2)$

$= (x - 2)(4x - 3)$

$\therefore 4x^2 - 11x + 6 = (x - 2)(4x - 3)$

Tusaale:

Raadi isirrada $6x^2 - 25x + 14$

Furfuris:

Taranta labada tiro waa 84. Wadarta labada tiro waa -25.
$\therefore$ Labada tiro waa -21 iyo -4.

Kolkaas, $6x^2 - 25x + 14 = 6x^2 - 4x - 21x + 14$

$= 2x(3x - 2) - 7(3x - 2)$

$= (3x - 2)(2x - 7)$

$\therefore 6x^2 - 25x + 14 = (3x - 2)(2x - 7)$

Layli:

1. $2x^2 - 11x + 5$
2. $2y^2 + 3y + 1$
3. $3y^2 + 5y + 2$
4. $3t^2 + 5t - 2$
5. $5x^2 + 9x + 2$
6. $1 + 4x + 3x^2$
7. $6x^2 - 7x - 3$
8. $2x^2 + 7xy + 3y^2$
9. $18y^2 + 33y - 30$
10. $3x^2 + 7x + 2$
11. $4t^2 + 9t + 5$
12. $7x^2 + 10x + 3$
13. $15 - 2a - a^2$
14. $3n^2 + 3n - 18$
15. $35 + 36y + y^2$
16. $1 + 2a - 3a^2$
17. $x^2 - 6xy + 5y^2$
18. $3x^2 - 4x + 1$
19. $x^2y^2 - 4xy - 77$
20. $12r^2 + 14r - 20$

ISKUDARIDDA DHOWR JAAD OO ISIREYN AH

Mararka qaarkood waxa la ina siiyaa tibaax aljebre oo tibaaxleheedu ay wadaagaan isir u dahsoon. Markaa, waxa habbooon inaynu eegno in uu jiro isir ay wadaagaan, oo laga saari karo. Marka laga saaro isirka ka dhexeeya tibixaha, waxaan eegnaa inay tahay kuwa soo socda midkood.

1) Faraqa laba labajibaar.
2) Saddextibix labajibbaaran.
3) Taranta laba labatibix.

4) Haddii saddexdaa midna aanay ahayn waa saddext bix mutuxan; waa saddextibix aan isirro lahayn.

U fiirso tusahan hoos ku yaal.

Faraqa labajibbaar	Saddextibix labajibbaaran	Taranta labatibix
$3y^2 - 27y$	$-x^2 + 2x - 1$	$5x^2 - 15x + 10$
$=3y\ (y^2 - 9)$	$= -1\ (x^2 - 2x + 1)$	$= 5\ (x^2 - 3x + 2)$
$= 3y\ (y + 3)\ (y - 3)$	$= -(x - 1)^2$	$= 5\ (x - 2)\ (x - 1)$

5) Marka aad heshid isirrada tibixaale, waxaad qortaa isirrada oo dhan adoo ku daraaya wixii isir haltibix ah. Isirka haltibix ahi wuxuu noqon karaa taran, isirrada kale oo dhammise waa inay mutuxnaadaan. Taasi waxay tahay inaanu midna sii lahaan isirro. Markaas ayey isireyntu dhan tahay.

6) Had iyo jeer isku dhufo isirrada si aad u hubisid inay tarantoodu ku siiso tibaaxdii aad haysatay.

Marka aad isireyneyso tibixaale, kolka ugu horreysa raadi inuu jiro isir ay wadaagaan tibxuhu, dabadeedna raadi isirtada labatibixyada ah ee taranta inta hartay. Isirrada gebigood u qor sansaan taraneed.

Layli:

Sheeg isirka ay wadaagaan tibixuhu, dabadeedna raadi isirradda tibaaxahan:

1) $4x^2 - 16$
2) $15y^2 - 135$
3) $6x^2 + 18x - 126$
4) $12x^2 - 22x + 10$
5) $20r^2 - 32r + 24$
6) $49x^2 - 14x + 1$
7) $24y^2 - 56y + 48$
8) $-9ay^2 + 9ax^2$
9) $9m^2 - 24m + 16$
10) $225b^2 - 64y$
11) $ay^2 - 12axy + 36ax^2$
12) $3x^2 + 6x - 144$
13) $-16 - 10y - y^2$
14) $-56 - 15y - y^2$

15) $7a^2 (a + 1) - 5a (a + 1) - 2 (2 + 1)$

16) $18x^2 (x + 1) + 24x (x + 1) + 8 (x + 1)$

17) $4n^2 - 40n - 96$

18) $5ax^2 - by^2 + bx^2 - 5ay^2$

19) $x^3 + x^2 - x - 1$

20) $m^4 - 13m^2 + 36$.

KU SHAQAYNTA ISIRRO TARANTOODU TAHAY EBER

Haddii aad ogtahay in taranta laba tiro ay tahay eber, maxaynu ka sheegi karnaa tirooyinkaas? Bal ka soo qaad in $a \cdot b = 0$, $a \neq 0$.

Kolba haddii $a \neq 0$ rogaalka (isweydaarka-iskudhufashada) a oo ah $\frac{1}{a}$ wuu jiraa, mana aha eber. Marka aan adeegsanno xeerka isle'ekaanta iskudhufashada waxaan dhinac kasta ku dhufannaa $\frac{1}{a}$.

$\frac{1}{a} (ab) = \frac{1}{a} (0)$

$[\frac{1}{a} a] \; b = 0$ — Dhinaca bidixda waxaan isticmaalnaa xeerka hormagelinta iskudhufashada. Dhinaca midigta xeerka iskudhufashada tiro iyo eber.

$1 \cdot b = 0$ — Taranta tiro kasta iyo rogaalkeedu waa 1.

$b = 0$ — Asal madoorshaha iskudhufashada.

Sidaas oo kale ayaynu u tusi karnaa in $a = o$ haddii $ab = 0$, $b \neq 0$. Haddii $a = 0$, $b = 0$, kolkaas $ab = 0$.

Qeex:

Taranta laba tibxood ama wax ka badani waa eber haddii isirradeeda midkood tahay eber.

Tusaale:

Furfur isle'egtan $13 (a - 5) = 0$.

Furfuris:

Waxaan naqan in $13 \neq 0$, sidaas awgeed ayay

$$a - 5 = 0. \quad a = 5.$$

Ururka furfurista ee isle'egtan waa { 5 }

Tusaale:

Furfuris isle'egtan $(x - 1) (x + 2) = 0$.

Furfuris:

Haddii $(x - 1) (x + 1) = 0$, kolkaas $(x - 1) = 0$ ama $(x + 2) = 0$.

Ururka furfurista ee $x - 1 = 0$ iyo $x + 2 = 0$ ayaa sameeya ururka furfurista ee $(x - 1) (x + 2) = 0$.

$$x - 1 = 0 \text{ ama } x + 2 = 0$$

$$x = 1 \text{ ama } x = -2$$

Ururka furfurista ee isle'egta waa $\{1, -2\}$

Layli:

Furfur isle'egyadan:

1) $14(a - 6) = 0$
2) $13(a + 5) = 0$
3) $-12(a - 4) = 0$
4) $16(a - \frac{1}{4}) = 0$
5) $16(\frac{1}{a} - \frac{3}{4}) = 0$
6) $18(\frac{1}{5} + \frac{2}{a}) = 0$
7) $12(15 + t) = 0$
8) $0(t + 6) = 0$
9) $6(t + 6) = 0$
10) $65(15 - \frac{1}{5}y) = 0$
11) $(x + 3)(x - 2) = 0$
12) $(x + 7)(x - 5) = 0$
13) $(y + 4)(y - 6) = 0$
14) $0 = (y + 7)(y + 9)$
15) $0 = (x - 5)(x - 8)$
16) $0 = y(2y + 1)$
17) $0 = y(5 + 5)$
18) $(6y + 12)(3y - 18) = 0$
19) $(4x - 8)(-3x + 8) = 0$
20) $y(4y - 5)(y + 4) = 0$

FURFURISTA ISLE'EGYADA TIBIXAALE ADOO ADEEGSANAYA ISIRAYN:

Isle'eg tibixaale waa isle'eg dhinaceeda midig iyo dhinaceeda bidix ay yihiin tibixaale. Isle'eg tibixaale waxay u qoran tahay sansaan beegal haddii labadooda dhinac mid yahay eber, ka kalena uu yahay tibixaale tibixaha isu eg oo dhan la isu geeyey. Sansaanta beegalka ah ee $x^2 - 30x = 100$ waa $x^2 - 30x - 100 = 0$. Isle'egta sidan oo kale ah heerkeedu wuxuu yahay 2. Waxaana loo yaqaan isle'eg saabley ah. Heerka isle'eg tibixaale wuxuu yahay heerka ugu weyn ee tibixaheeda mid ka mid ahi leeyahay marka loo qoro sansaan beegal ah. Isle'eg heerkeedu yahay hal sida $2x + 4 = 3x - 5$ waxa loo yaqaan isle'eg toosan. Marka loo qoro sansaanta beegal ah waxay noqotay $x - 9 = 0$. Isle'egta $x^3 - 4x^2 + 5x = 0$ heerkeedu yahay 3 waa isle'eg saddexjibbaar. Haddii isle'eg tibixaale aad u qortid sansaanta beegalka ah, oo dhinaca bidixda aad isiraysid, waxaad heshaa **furfuristeeda** ama **xididkeeda** marka isirrada ugu yaraan midkood le'eg yahay eber. Waayo mar kasta isirradu waxay yihiin kuwo la isku dhufanayo, oo dhufsanuhu yahay eber.

Tusaale:

Furfur isle'egta $x^2 - 5x = 24$.

Furfuris:

1) Isle'egta u qor sansaanta beegalka ah
$$x^2 - 5x - 24 = 0$$
2) Isiree dhinaca bidix
$$(x - 8)(x + 3) = 0$$
3) Isir kasta u sin eber
$$x - 8 = 0; \quad x + 3 = 0$$

4) Furfur isle'egyada toosan ee soo baxay

$$x = 8;\ x = -3$$

5) Hubi xidid kasta adoo ku eegaya isle'egtii lagu siiyey

$$x^2 - 5x = 24$$

$(8)^2 - 5\,(8) = 24$ | $(-3)^2 - 5\,(-3) = 24$

$64 - 40 = 24$ | $9 + 15 = 24$

$24 = 24$ haa | $24 = 24$ haa

Ururka furfurista waa $\{8, -3\}$

Waxa badanaaba dhacda marka aad furfurayso isle'eg tibixaale adeegsanaysana dariqada isireynta in aad la kulantid siyaabaha soo socda:

1. Tibixa tibixaalè oo leh isir ay wadaagaan oo tiro ah. Kolley isirka sidaas ahi maaha eber. Kolkaa, waxa fiican in aad ka saartid adoo u qaybinayaa tiradaa dhinac kasta.
2. Laba ama wax ka badan oo isirrada ah ayaa isku mid ah. Isirrada noocaas ah waxay ku siiyaan xididdo isku mid ah, oo loo baahan yahay in aad qortid mar kaliya markii aad taxaysid.

Tusaale:

Furfur: $4x^2 - 24x + 36 = 0$

urfuris:

1) Dhinac kasta u qaybi 4

$$x^2 - 6x + 9 = 0$$

2) Raadi isirrada dhinaca bidix

$$(x - 3)\,(x - 3) = 0$$

3) Le'egkaysii isir kasta eber

$$x - 3 = 0;\ x - 3 = 0$$

4) Furfur isle'egta toosan ee soo baxday.

$$x = 3;\ x = 3$$

5) Ku hubi isle'egtii lagu siiyey

$$4x^2 - 24x + 36 = 0$$

$$4\,(3)^2 - 24\,(3) + 36 = ?\ 0$$

$$4 \cdot 9 - 72 + 36 = ?\ 0$$

$$36 - 72 + 36 = ?\ 0$$

$$72 - 72 = ?\ 0$$

$$0 = 0$$

Masalooyin (weyddiino) kale waxaad kula kulmi isir haltibix ah oo ay wadaagaan bixaale oon tiro ahayn ee doorsoome ah. Isirka sidaas oo kale ihi wuxuu leeyahay qiimaha h eber, waana xidid. Sidaas awgeed laguma saaro u qaybinta tibxaha.

Tusaale:

Furfur $x^3 - 4x^2 + 3x = 0$

Furfuris:

1) Raadi isirrada dhinaca bidix

$$x(x^2 - 4x + 3) = 0$$

$$x(x - 3)(x - 1) = 0$$

2) Le'egkaysi isir kasta eber

$$x = 0;\quad x - 3 = 0;\quad x - 1 = 0$$

3) Furfur isle'egta toosan

$$x = 0\quad x = 3;\quad x = 1$$

4) Ku hubi qiima kasta isle'egtii hore

$$x^3 - 4x^2 + 3x = 0$$

b) $(0)^3 - 4(0)^2 + 3(0) = ?\ 0$

$0 - 0 + 0 = ?\ 0$

$0 = 0$; haa.

t) $(3)^3 - 4(3)^2 + 3(3) = ?\ 0$

$27 - 36 + 9 = ?\ 0$

$36 - 36 = ?\ 0$

$0 = 0$; haa.

j) $(1)^3 - 4(1)^2 + 3(1) = ?\ 0$

$1 - 4 + 3 = ?\ 0$

$4 - 4 = ?\ 0$

$0 = 0$; haa.

$\therefore$ Ururka furfurista waa $\{0, 1, 3\}$.

Layli:

I. Furfur isle'egyadan soo socda. Hubi jawaabaha.

1) $x^2 - 3x + 2 = 0$
2) $x^2 - 7x + 10 = 0$
3) $x^2 + x - 2 = 0$
4) $x^2 - 2x - 3 = 0$
5) $x^2 - 3x = 0$
6) $x^2 + 7x = 0$
7) $x^2 + 7x + 12 = 0$
8) $y^2 - 2y - 8 = 0$
9) $y^2 - 2y + 1 = 0$
10) $x^2 - 5x + 4 = 0$
11) $y^2 - 9y = 0$
12) $y^2 - 9 = 0$
13) $x^2 = 16$
14) $m^2 - 8m - 9 = 0$
15) $5y^2 + 11y + 2 = 0$
16) $6x^2 + 13x - 5 = 0$
17) $8x^2 + 14x = 15$
18) $25y^2 = 9$
19) $6m^2 = 7m + 20$
20) $15d^2 + 23d - 28 = 0$
21) $70m = 24m^2 + 49$
22) $y^3 - 6y^2 - 40y = 0$
23) $d^3 + 8d^2 - 84d = 0$
24) $x^4 - 17x^2 + 16 = 0$
25) $(2m - 1)^2 + 3m(m - 3) = 3(m - 2)(m - 1) - 5$

II. Raadi isle'egta leh heerka ugu hooseeya lehna ururka furfurista.

Tilmaan $x \in \{0, 2, -3\}$.

Furfuris:

$x = 0$; $x - 2 = 0$; ama $x + 3 = 0$

$x = 0$; $x = 2$; $x = -3$

$x(x - 2)(x + 3) = 0$

$x(x^2 + x - 6) = 0$

$x^3 + x^2 - 6x = 0$

1) $y \in \{2, 4\}$
2) $x \in \{-1, 2\}$
3) $x \in \{2, 1\}$
4) $y \in \{1, -1, 2\}$
5) $x \in \{0, 3, 2\}$
6) $y \in \{-2, 3, 2, 3\}$
7) $m \in \{1, 2, 3,\}$
8) $n \in \{0, -1, 1\}$
9) $r \in \{\frac{2}{3}, \frac{1}{4}\}$

ADEEGSIGA ISIREYNTA SI LOO FURFURO MASALO

Ilaa hadda waxaan soo aragnay sida loo furfuro isle'eg tibixaale, innaga oo adeegsanay isireyn. Hadda, waxaan furfuri doonnaa mas'alooyin ku qoran weedho, kuwaas oo aan u beddelanno xuruuf iyo tirooyin si furfuristu fudayd u noqoto.

Tusaale:

Laydi ayaa dhererkiisu ka weyn yahay 2 santimitir ballaciisa, bedka laydigu waa 99 sm oo labajibbaar ah. Raadi dhinacyada.

Furfuris:

Jidka bedka laydi waa: ballaca × dherer = lb.

Ballaciisu wuxuu yahay = x sm.

Dhererkiisuna = $(x + 2)$ sm.

Bedka laydigu = 99 sm laba jibbaaran.

u qor sansaanta:

$A = lb$

$99 = (x + 2)x$

$= x^2 + 2x$

$= x^2 + 2x - 99 = 0$

$x = -11$, ama

$x = 9$

Marka aynu helno xididdada isle'egta ayaan maskaxdeenna la kaashannaa, kolkaas waxaan tuuraynnaa xididka taban waayo, ballacu ma noqdo tiro taban, jihana kama hadlayno.

Hubi $x^2 + 2x = ?\ 99$ $\quad (9)^2 + 2(9) = ?\ 99$

$81 + 18 = ?\ 99$ $\quad 99 = 99$

Ama bedka laydigu ma le'eg yahay 99 sm oo labajibbaar ah. Ballacu waa $x = 9$sm. dhererkuna waa $x + 2 = 9 + 2 = 11$. Bedka = dherer x Ballac.

$$99 = 11 \times 9$$

Ururka furfuristu wuxuu ina siinayaa jawaabaha **suuragalka ah. Waxa inala gudboon in** aynu kala saarno iyadoo la tixgelinayo mar kasta sida weedhaha mas'aladu u qoran tahay, si loo helo jawaabta **runta** ah.

Tusaale:

Iskaashato ayaa rabta inay dhulkeeda ku wareejiso dayr taar ah. Haddii dhulkeedu uu yahay 20,000 mitir oo labajibbaar ah, ballaca dhulkeennuna uu ka yar yahay 100 mitir dhererka. Taarka ay haysato iskaashataduna waa 1000 mitir dhererkiisu. Intee mitir ayaa uga soo haraysa taarka?

Furfuris:

Waxa loo baahan yahay in aynu helno dhrerka iyo ballaca dhulka iskaashatada.

Bedka dhulku wuxuu yahay = 20,000 mitir oo labajibbaar ah.

Bedka dhulku wuxuu le'eg yahay = Ballac x dherer.

Dhererka dhulku wuxuu ka weyn yahay 100 mitir ballaca.

Kolkaas haddii ballacu yahay x mitir, dhererkuna waa $(x + 100)$ mitir.

Bed = ballac × dherer

$20{,}000 = x\ (x + 100)$

$20{,}000 = x^2 + 100x$

$x^2 + 100x - 20{,}000 = 0$

$(x + 200)\ (x - 100) = 0$

$x = -200$ ama $x = 100$. Kolkaa waynu tuuri -200, sidaas awgeed ayaa ballaca dhulku yahay 100 mitir, dhererkuna waa $x + 100 = 100 + 100$ mitir. Dhererka taarku waa 1000 mitir, kolkaas si aan u ogaano inta u soo haraysa waxa loo baahan yahay in aynu helno wareegga dhulka.

Wareegga dhulku waa = 2 (ballac + dherer)

$$= 2\ (100 + 200) = 2 \times 300 = 600 \text{ mitir.}$$

Iskaashatadu waxay haysataa 1000 mitir oo taar ah, waxayna ka isticmaali rabtaa 600 mitir.

Inta taarka uga hartay = dhererka taarka dhan — taarka inta ay ka isticmaashay.

Inta taarka uga hartay = 1000m — 600m = 400 mitir.

Layli:

1. Haddii tiro aan labanlaabno, dabadeedna ku darno 3, labajibbaarka tiraddasu waxay tahay 81. Maxay ahayd tiradii hore?
2. Salka saddexagal wuxuu ka weyn yahay joogga saddexagalka 7 sentimitir. Bedka saddexagalku waa 39 sm^2. Raadi joogga.
3. Bedka saddexagal BTJ waa 56 santimitir oo labajibbaar ah. Raadi qiimaha salka

iyo joogga, haddii jooggu 6 sm salka ka weyn yahay.

4. Dhinac laydi ayaa ka weyn ka kale 4 sm. Haddii bedka laydigu yahay 320 sm oo labajibbaar ah. Waa maxay dhererka labada dhinac?
5. Dhererka qol wuxuu 4 fuudh ka weyn yahay ballac qolka. Haddii bedka qolku uu yahay 21 fuudh oo labajibbaar ah, waa maxay dhererka iyo ballaca qolku?
6. Waa maxay laba tiro oo faraqoodu yahay 4, tarantooduna tahay 221?
7. Waa maxay laba tiro oo faraqoodu yahay 7, tarantooduna tahay 144?
8. Laba tiro ayaa faraqoodu yahay 4. Wadarta labada tiro oo labajibbaaranna waa 170.Raadi labada tiro.
9. Raadi laba tiro oo wadartodu tahay 30, tarantooduna tahay 200.
10. Wareegga qol waa 60 mitir, bedka qolkaasi waa 209 mitir oo labajibaar ah. Waa maxay dhererka iyo ballaca qolku?
11. Raadi laba abyoone oo isku xiga oo ay tarantoodu tahay 132.
12. Raadi laba tiro oo dhaban ah oo isku xiga, tarantooduna tahay 80.
13. Raadi laba tiro oo kisi ah oo isku xiga, tarantooduna tahay 143.
14. Labajibbaarka tiro waxay ka yar tahay 88 toban iyo sagaal laabka tirada nafteeda. Waa maxay tiradaasu?
15. Tirooyinka 13 iyo 21 ayaa labadooduba in isle'eg laga jaray. Taranta tirooyinka cusubi waa 153. Maxay ahayd inta laga jaray labada tiro?

DHAMMAYSTIRKA LABAJIBBAARKA

Badanaaba kuuma suurtowdo in aad furfurtid isle'eg saabley adoo adeegsanaya dariiqada isreynta. Marka aad la kulantid isle'eg saabley oo aanad isirradeeda heli karin, waxaa habboon in aad taqaanid dariiqooyin kale oo aad ku furfurtid.

Isle'egta $x^2 + x - 1 = 0$ oo kale ma laha isirro aan aragti ku garan karno. Haddaba, sidee baan u furfuri karnaa? Dariiqada loo yaqaan dhammaystirka labajibbaarka waxaa loo baahan yahay in aad u beddelatid isle'eg kasta oo saabley sansaanta ah $(ax + b)^2 = t$, dabeetana aad furfurtid.

Waxaan naqaan in tibaax saabley ay tahay labajibaar dhan oo saddextibix haddii laba ka mid ah saddexda tibxood ay yihiin labajibbaar dhan, ta saddexaadna labanlaabka taranta xididdada labajibbaarka ee labada tibixood ee kale.

TILMAAN: $4x^2 + 12x + 9$ waxay tahay labajibbaar dhan oo saddextibix, waayo $4x^2$ iyo 9 waxay yihiin labajibbaarka 2x iyo 3. Tibixda dhexda oo ah 12x waxay tahay labanlaabka taranta 2x iyo 3.

Tusaale:

Waxaad qortaa kuwa soo socda, buuxina tibixaha maqan, si ay u noqdaan labajibbaar han.

Furfuris:

b) $x^2 + 14x$ — $14x = 2(7x)$. Kolkaas tibixda maqani waxay tahay $(7)^2$ ama $49.x^2 + 14x + 49$ waxay tahay labajibbaar dhan oo saddextibix.

t) $x^2 + 25$ — Xididdada labajibbaarka ee x^2 iyo 25 waxay yihiin x iyo 5. Tibixda maqani waa $2(5)(x) = 10x$. $x^2 + 10x + 25$ waa labajibbaarka dhan ee saddextibixa.

j) $4x^2 + 16$ Taranta xididdada labajibbaarrada labada tibixood waxay tahay $(2x)(4) = 8x$. Tibixda maqani waa labanlaabka tarantooda ama $16x$. $4x^2 + 16x + 16$ waa labajibbaarka dhan ee saddextibix.

x) $9x^2 + 30x$ Xididka labajibaarka tibixda hore waa $3x$. $30x$ waxay le'eg tahay $(3x)(10)$ ama $2(3x)(5)$, haddaba tibixda maqani waa 5^2 ama 25; $9x^2 + 30x + 25$ waa labajibbaarka dhan ee saddextibixa.

Tusaale:

Waxaad u qortaa isle'egyada sansaanta $(x + b)^2 = t$. Raadi qiimaha b iyo t.

1) $x^2 + 5x = 13$

$x^2 + 5x + (\frac{5}{2})^2 = 13 + (\frac{5}{2})^2$. Maxaan ugu darnay $(\frac{5}{2})^2$ dhinac kasta? Isle'eg labada dhinac way isle'eg yihiin. Sidaas awgeed ayaa wax isle'eg dhinac kasta aynu ugu darnay.

$$x^2 + 5x + \frac{25}{4} = \frac{52}{4} + \frac{25}{4}$$

$(x + \frac{5}{2})^2 = (\frac{52}{4}) + (\frac{25}{4})$ Raadi isirrada dhinaca bidix

$(x + \frac{5}{2})^2 = \frac{77}{4}$

$b = \frac{5}{2}$; $t = \frac{77}{4}$

2) $5 + 8x = 2x^2$

$2x^2 - 8x = 5$ Dhinac u wada wareeji tibxaha x leh.

$x^2 - 4x = \frac{5}{2}$ Dhinac kasta u qaybi 2.

$x^2 - 4x + 4 = (\frac{5}{2}) + 4$ Dhinac kasta u gee 4.

$(x - 2)^2 = (\frac{5}{2}) + (\frac{8}{2})$ Raadi isirrada dhinaca bidixda

$(x - 2)^2 = \frac{13}{2}$

$b = -2$; $t = \frac{13}{2}$

Layli:

I. Guuri weydiimaha 1 ilaa 20, buuxina meelaha maran, si tibaaxdu u noqoto labajibbaar dhan ee saddextibixyada:

1. $x^2 - 12x + (\quad)$
2. $4t^2 + 4t + (\quad)$
3. $x^2 - (\quad) + 0$
4. $(\quad) - 20d + 25$
5. $8x + (\quad)$
6. $x^2 + 11x + (\quad)$
7. $4x^2 + (\quad) + 10$
8. $5x + 9 + (\quad)$

9. $8x + (\quad) + 10$
10. $25 - 36t + (\quad)$
11. $4y^2 + 20xy + (\quad)$
12. $(1 + t)^2 + 4(1 + t) + (\quad)$
13. $x^2 + 5x + (\quad)$
14. $9j^2 + 30j + (\quad)$
15. $100y^2 - (\quad) + 9$
16. $(\quad) + 35s + 36$
17. $25 + 70s + (\quad)$
18. $x^2 + (\quad) + 20$
19. $9x^2 + 3x + (\quad)$
20. $m^4 - 10m^2 + (\quad)$

II. Weydiimaha 21 ilaa 36 waxaad u qortaa sansaanta $(x + b)^2 = t$. Waxaad u qaybisaa tibix kasta ee isle'egta weheliyaha x^2 (Haddaanu ahayn 1).

21. $x^2 - 6x = 11$
22. $x^2 + 16x - 3 = 0$
23. $x^2 + 5x = 5$
24. $2x^2 + 8x + 3 = 0$
25. $3x^2 + 6x - 2 = 0$
26. $2x^2 + 6x = 7$
27. $3x^2 - 9x = 0$
28. $5x^2 + 10x - 12 = 0$
29. $2x^2 - 3x + 7 = 0$
30. $ax^2 + 2bx + t = 0$
31. $x^2 + dx + j = 0$
32. $(x + 2)(x - 3) = 0$
33. $21x = 7 - 14x^2$
34. $5x^2 + x = 0$
35. $(x + 1)(x - 1) = 4x$
36. $nx = m^2 - tx^2$

FURFURISTA ISLE'EG SAABLEY IYADOO LA ADEEGSANAYO DHAMMAYSTIRKA LABAJIBBAARKA

Ilaa hadda waxaynu barannay sida isle'eg saabley ah loogu qoro sansaanta $(x + b)^2 = t$. Kolkaa, waxa inoo furan in aan baranno sida loo furfuro isle'eg saabley ah, iyadoo la adeegsanayo dhammaystirka labajibbaarka.

Tusaale:

Furfur isle'egtan adoo adeegsanaya dhammaystirka labajibbaarka.

$$x^2 - 6x - 7 = 0$$

Furfuris:

$x^2 - 6x = 7$ — Mar kasta tibixda tirada ah geyso dhinaca midigta. Sababtu maxay tahay?

$x^2 - 6x + 9 = 7 + 9$ — Dhinac kasta u geyso weheliyaha tibixda dhexda oo aad u qaybiso laba, dabadeedna aad labajibbaarto. Sababta taas aan u samaynaynaa waxay tahay in aan ognahay in labajibbaarka dhan ee saddextibix uu ka kooban yahay saddex tibixood oo ay laba yihiin labajibbaarro dhan, ta saddexaadna labanlaabka taranta xididdada labajibbaarrada tibixaha labajibbaaran. Kolkaa, innagu waxaan raadinaynaa in aan ku qorno dhinaca bidix ee isle'egta iyadoo ah labajibbaar dhan.

$(x - 3)^2 = 16$ — Dhinaca bidix isiree, isle'egtana u dhig sansaanta $(x + b)^2 = t$.

$(x - 3)^2 - 16 = 0$ — Dhinac kasta ku dar (-16).

$\{(x - 3) + 4\}\{(x - 3) - 4\} = 0$ — Waxaynu naqaan haddaynu haysanno $x^2 - y^2$ inay isirradu yihiin $(x + y)(x - y)$.

Markaa $(x - 3) + 4 = 0$ ama $(x - 3) - 4 = 0$

$x + 1 = 0$ ama $x - 7 = 0$

$x = -1$ ama $x = 7$

Hubin: Qiimayowga, x, ku beddel isle'egta $x^2 - 6x - 7 = 0$.

Marka: $x = -1$

$$(-1)^2 - 6(-1) - 7 \stackrel{?}{=} 0$$

$$1 + 6 - 7 \stackrel{?}{=} 0$$

$$7 - 7 \stackrel{?}{=} 0$$

$$0 = 0$$

Marka: $x = 7$

$$(7)^2 - 6(7) - 7 \stackrel{?}{=} 0$$

$$49 - 42 - 7 \stackrel{?}{=} 0$$

$$49 - 49 \stackrel{?}{=} 0$$

$$0 = 0$$

Tusaale:

Furfur adoo adeegsanaya dhammaystirka labajibbaarka:

$$x^2 + 5x - 6 = 0$$

Furfuris:

$x^2 + 5x - 6 = 0$

$x^2 + 5x = 6$ Madoorsoomaha geyso dhinaca midig.

$x^2 + 5x + \frac{25}{4} = 6 + \frac{25}{4}$ Dhinac kasta u gee weheliyaha tibixda dhexe oo aad u qaybiso laba, dabadeedna aad labajibbaartó.

$(x + \frac{5}{2})^2 = \frac{49}{4}$ Isle'egta u dhig sansaanta $(x + b)^2 = t$

$(x + \frac{5}{2})^2 - \frac{49}{2} = 0$ Dhinac kasta ku dar $\frac{-49}{2}$

$[(x + \frac{5}{2}) + \frac{7}{2}] \quad [(x + \frac{5}{2}) - \frac{7}{2}] = 0$ Isiree dhinaca bidix.

$(x + \frac{12}{2}) \quad (x - \frac{2}{2}) = 0$

$(x + 6)(x - 1) = 0$

Markaa, $x + 6 = 0$ ama $x - 1 = 0$

$x = -6$ ama $x = 1$

Hubin: Qiimayowga x ku beddel isle'egta

$x^2 + 5x - 6 = 0$

Marka $x = -6$

$(-6)^2 + 5(-6) - 6 = 0$

$36 - 30 - 6 = 0$

$36 - 36 = 0$

$0 = 0$

Marka $x = 1$

$(1)^2 + 5(1) - 6 = 0$

$1 + 5 - 6 = 0$

$6 - 6 = 0$

$0 = 0$

Layli:

1. $x^2 + 2x - 15 = 0$
2. $x^2 + 2x - 5 = 0$
3. $x^2 + 2x - 3 = 0$
4. $2x^2 + 4x + 2 = 0$
5. $x^2 - 3x + 4 = 0$
6. $x^2 + 7x + 10 = 0$
7. $5x^2 - 7x = x^2 + 2x - 5$
8. $4x - 1 = -x^2 - 3x - 13$
9. $3x^2 - 2x - 1 = 0$
10. $x^2 - 7x - 18 = 0$
11. $x^2 + 4x + 4 = 0$
12. $x^2 - 5x = 24$
13. $x^2 - 2x - 8 = 0$
14. $y^2 - 9y = 9$
15. $x^2 - 2x - 2 = 0$
16. $3y^2 - 4y = 4$
17. $2x^2 - 4x + 1 = 0$
18. $5x^2 + x - 6 = 0$
19. $ax^2 + bx + t = 0$
20. $kx^2 - kx - 1 = 0$

JIDKA SAABLEY

Isle'eg kasta oo jibbaarka ugu weyn ee doorsoomuhu uu yahay 2 waxa lagu qori karaa sansaanta $ax^2 + bx + t = 0$, $a \neq 0$, a, b, iyo t waa madoorsoomayaal. Isle'egta $2x^2 - 3x + 6 = 0$, $a = 2$; $b = -3$; $t = 6$ sidaas oo kale isle'egta $x^2 - 17 = 0$, $a = 1$; $b = 0$; $t = -17$.

$6x^2 = 8 - x$ waxay noqonaysaa $6x^2 + x - 8 = 0$ marka aan isugu wareejino dhinaca bidix, dabadeedna tibixaha is leh raadsanno.

Kolkaa, $a = 6$; $b = 1$; $t = -8$. Isle'egta $(4 - x)^2 = 7$ waxaan u qori karnaa sida sansaanta guud haddii aynu kala bixinno dhinaca bidix, dabadeedna tibixaha is leh isla raadsanno.

$$(4 - x)^2 = 7$$

$$16 - 8x + x^2 = 7$$

$x^2 - 8x + 9 = 0$, Kolkaas $a = 1$; $b = -8$; $t = 9$

Kol haddii ay tahay $ax^2 + bx + t = 0$ sansaanta guud ee isle'eg kasta oo saabley, oo aan dabadeedna furfurno waxa innoo soo baxa qiimaha x oo inoogu samaysan madoorsoomayaasha a, b iyo t. Waxa inooga soo baxa waxan u qaadan karnaa in ay tahay jid aan raacno

markii aan doonayno in aan furfurno isle'eg saabley sansaanta guud u qoran. a, b iyo t waa tirooyin maangal ah. Haddii a = 0, isle'egteenu waxay isu beddelaysaa bx + t = 0 oo ah isle'eg toosan. taasi waxay ina tusaysaa in a marna le'ekayn eber haddii isle'egtu tahay saabley.

Furfur isle'egta $ax^2 + bx + t = 0$ adoo adeegsanaya dhammaystirka labajibbaarka.

$ax^2 + bx + t = 0$

$x^2 + \frac{b}{a} x + \frac{t}{a} = 0$ Dhinac kasta u qaybi a.

$x^2 + \frac{b}{a} x = -\frac{t}{a}$ Dhinac kasta ku dar $-\frac{t}{a}$

$x^2 + \frac{b}{a} x + (\frac{b}{2a})^2 = -\frac{t}{a} + (\frac{b}{2a})^2$ Waxaa habboon si aad u buuxisid labajibbaarka dhinaca bidix in aad u geysid weheliyaha tibixda dhexe oo laba loo qaybshay lana labajibbaaray.

$(x + \frac{b}{2a})^2 = -\frac{t}{a} + \frac{b^2}{4a^2}$ Raadi isirrada dhinaca bidix.

$(x + \frac{b}{2a})^2 = \frac{-4at+b^2}{4a^2}$ Isku dar tibxaha dhinaca midig.

$(x + \frac{b}{2a})^2 = \frac{b^2 - 4at}{4a^2}$ Xeerka kala hormarinta isugeynta.

Haddii aan u qaadanno in:

$$\Delta = \frac{b^2 - 4at}{4a^2}$$

isle'egtii waxa ay u qormaysaa sidan:

$$(x + \frac{b}{2a})^2 - (\sqrt{\Delta})^2 = 0$$

Marka aan isirayno dhinaca bidix ee isle'egta waxa aan heleynaa:

$$[(x + \frac{b}{2a}) + \sqrt{\Delta}] [(x + \frac{b}{2a}) - \sqrt{\Delta}] = 0$$

$$[x + (\frac{b}{2a} + \sqrt{\Delta})] [x + (\frac{b}{2a} - \sqrt{\Delta})] = 0$$

Waxa aad arki kartaa in

$$[x + (\frac{b}{2a} \sqrt{\Delta})] = 0 \quad \text{ama} \quad [x + (\frac{b}{2a} - \sqrt{\Delta})] = 0$$

$$\therefore x = -\frac{b}{2a} - \sqrt{\Delta} \quad \text{ama} \quad x = -\frac{b}{2a} + \sqrt{\Delta}$$

$$x = -\frac{b}{2a} - \sqrt{\frac{b^2 - 4at}{4a^2}} \quad \text{ama} \quad x = -\frac{b}{2a} + \sqrt{\frac{b^2 - 4at}{4a^2}}$$

Waxa aan u qori karnaa sidan fudud.

$$x = \frac{-b \pm \sqrt{b^2 - 4at}}{2a}$$

Tusaale:

Furfur adoo adeegsanaya jidka saabley.

$$x^2 - 4x + 3 = 0$$

Furfuris:

Jidka saabley wuxu yahay $x = \frac{-b \pm \sqrt{b^2 - 4at}}{2a}$

$b = -4$, Kolkaas $-b = 4$

$a = 1$

$t = 3$

Qiimayaasha —b, a, iyo t ayaan ku beddelaynaa

$$x = \frac{4 \pm \sqrt{(-4)^2 - 4 \cdot 1 \cdot 3}}{2 \cdot 1}$$

$$x = \frac{4 \pm \sqrt{16 - 12}}{2}$$

$$x = \frac{4 + \sqrt{4}}{2} = \frac{4+2}{2} = \frac{6}{2} = 3$$

$$\text{ama } x = \frac{4 - \sqrt{4}}{2} = \frac{4-2}{2} = \frac{2}{2} = 1$$

Ururka furfuristu waa {1, 3 }

Tusaale:

Furfur adoo adeegsanaya jidka saabley

$$3x^2 + 5x - 8 = 0$$

Furfuris:

$a = 3$

$b = 5$ kolkaas $-b = -5$

$t = -8$

$$x = \frac{-b \pm \sqrt{b^2 - 4at}}{2a}$$

$$x = \frac{-5 \pm \sqrt{5^2 - (4)(3)(-8)}}{2 \times}$$

$$x = \frac{-5 \pm \sqrt{25+96}}{6}$$

$$x = \frac{-5 \pm \sqrt{121}}{6}$$

$$x = \frac{-5 \pm 11}{6}$$

$$x = \frac{-5+11}{6} = \frac{6}{6} = 1$$

$$x = \frac{-5-11}{6} = \frac{-16}{6} = \frac{-8}{3}$$

Ururka furfuristu waa $\{1, -\frac{8}{3}\}$

Layli:

Furfur isle'egyadan. Adeegso jidka saabley:

1) $2x^2 + 7x + 3 = 0$
2) $7x^2 - 2x + 6 = 0$
3) $x^2 + (-x) + \frac{1}{2} - = 0$
4) $4x^2 - 2x + 12 = 0$
5) $x^2 - x + 3 = 0$
6) $10x^2 - 9x - 9 = 0$
7) $4x^2 - x = 0$
8) $6x^2 + 12x + 9 = 0$
9) $2x^2 + 3x + 1 = 0$
10) $x^2 + 5x + 6 = 0$
11) $x^2 - 4x - 21 = 0$
12) $3x^2 + 2x - 5 = 0$
13) $2x^2 = 4 - 3x$
14) $5x^2 = 0$
15) $x^2 - 3x + 4 = 0$
16) $5x^2 - 7x - 6 = 0$
17) $4x^2 - 12x - 7 = 0$
18) $2x^2 - 6x - 56 = 0$
19) $x^2 - x - 6 = 0$
20) $x^3 - x^2 - 2x = 0$
21) $kx^2 + lx + m = 0$
22) $ax^2 + 2x - 3 = 0$
23) $(2x - 3)^2 = 10$
24) $\frac{y+2}{y-3} = 2y$
25) $3x^2 - 14 = 0$

KU SHAQAYNTA JAJABYO

Jabjab iyo Saami

Qayb allaale qaybtii isu keenta laba tibixood oo aljebra, sida $\frac{3}{1}, \frac{4}{11}, \frac{-3}{5}, \frac{x}{6}, \frac{1}{s}$ iyo $\frac{m^2+3m+1}{2n-3}$ ayaa loo yaqaan **jabjab aljebra.**

U qaybinta eber (eber oo qaybshe ah) lama oggola; kol haddii aan la oggolaynna jajab wuxuu si fiican u qeexan yahay marka hooseeyihiisu aanu ahayn eber. U fiirso jajabka hoos ku yaal marka x aan lagu beddelan karin tirooyinka qaarkood. Si aad u heshid tirooyinkaas laga tagaayo ee aan beddeli karin x, waxaad le'ekeysiisaa hooseeyaha oo dhan eber. Isle'egta kuu soo baxdana furfur.

Jajab	$\frac{1}{x}$	$\frac{1}{x-4}$	$\frac{3x+4}{x+3}$	$\frac{2x+6}{4}$	$\frac{6}{x^2-4}$
Tirooy. laga Tagaayo ama aan la qaadan karin	0	4	—3	ma jirto tiro aan la qaadan karin	2 iyo —2

Layli:

Raadi qiimaha doorsoomaha ee jajabku aanu qeexnayn (jajabka ayaan macna lahayn).

Tilmaan:

1) $\frac{m}{2m-4}$ Waxaanay qeexnayn marka $m = 2$; waayo $(2 \times 2) - 4 = 0$.

2) $\frac{x+2}{x^2+3x+2}$ Waxaanay qeexnayn marka $x = -2$ iyo -1; waayo $x^2 + 3x + 2 = (x + 2)(x + 1)$ sidaas awgeed ayaa $(-2 + 2)(-2 + 1) = 0 . -1 = 0$

$(-1 + 2)(-1 + 1) = 1 . 0 = 0$

3) $\frac{1}{x-y}$ Waxaanay qeexnayn marka $x = y$ waayo $x - y = 0$.

1. $\frac{1}{3x}$
2. $\frac{x^2+3}{x+4}$
3. $\frac{a-8}{a-8}$
4. $\frac{y+5}{y^2}$
5. $\frac{1}{t^2+4t+4}$
6. $\frac{4y+16}{y^2-y-72}$
7. $\frac{8y+4}{5y+15}$
8. $\frac{3f^2+6f+9}{f^2-6f+9}$
9. $\frac{2x+9}{x^2+x-90}$
10. $\frac{a+4}{a^2-4}$
11. $\frac{3y}{y^2-9}$
12. $\frac{x+4}{x^2-16}$
13. $\frac{1}{x(x-y)}$
14. $\frac{mn}{m^2+2mn+n^2}$
15. $\frac{r+d}{r^2-d^2}$

Fududeynta Jajab

Jajabka $\frac{4}{9}$ iyo $\frac{12}{27}$ waxay sheegaan tiro kaliya; waayo haddii aan isticmaalno astaanta qaybta waxaan naqaan in $\frac{12}{27} = \frac{4 . 3}{9 . 3} = \frac{4}{9}$. Sidaas oo kale ayaa jajab sansaantiisu tahay $\frac{3x}{4x}$ u le'eg yahay $\frac{3}{4}$ waayo $\frac{x}{x}$ ayaa le'eg 1 haddii aanay $x \neq 0$.

Tusaalahani wuxuu caddaynayaa astaanta isku dhufashada jajab.

Ku dhufashada iyo u qaybinta hooseeyaha iyo sarreeyaha jajab tiro isku mid ah, oo aan ahayn eber, waxay ku siisaa jajab le'eg kii aad awal haysatay.

Sidaas awgeed ayaa

$\frac{-30}{26} = \frac{-5 \cdot 6}{6 \cdot 6} = \frac{-5}{6}$, $\frac{24x}{12x^2} = \frac{2 \cdot 12x}{x \cdot 12x} = \frac{2}{x}$ haddii $x \neq 0$.

Jajab wuxuu u qoran yahay sansaanta ugu fudud marka sarreeyaha iyo hooseeyaha aanu ka dhaxayn isir ay wadaagaan oo aan ahayn 1 iyo — 1. Fududaynta jajab waxay la mid tahay adoo u qaybiya hooseeyaha iyo sarreeyaha isir weynaha ay wadaagaan.

Tusaale:

Fududee $\frac{24x + 6}{8x^2 - 6x - 2}$

Furfuris:

1. Raadi isirrada sarreeyaha iyo hooseeyaha

$$\frac{6(4x + 1)}{(2x - 2)(4x + 1)}$$

2. U qaybi sarreeyaha iyo hooseeryaha isir weynaha ay wadaagaan oo ah $4x + 1$

$$\frac{6(4x + 1) \div (4x + 1)}{(2x - 2)(4x + 1) \div (4x + 1)}$$

3. Fududee waxa kuu soo baxa $\frac{6}{2x - 2} = \frac{3}{x - 1}$ haddii $x \neq 1$. Haddii $x = 1$ jabkii awal aynu haysannay ayaa noqonaya mid aan micna lahayn.

Tusaale:

Fududee $\frac{8 - m}{m^2 - 64}$

Furfuris:

$$\frac{8 - m}{m^2 - 64} = \frac{8 - m}{(m - 8)(m + 8)}$$

$$8 - m = -1(m - 8)$$

Kolkaa, $\frac{-1(m - 8)}{(m - 8)(m + 8)} = \frac{-1}{m + 8}$ haddii $m \notin \{-8, 8\}$

Jajabka $\frac{-1}{m + 8}$ waxa loo qori karaa sansaanta ah $-\frac{1}{m + 8}$ waayo jajab waxa aad fududayn kartaa uun marka sareeyaha iyo hooseeyaha oo kaliya ay leeyihiin isir ay wadaagaan. Isgarab dhig labadan jajab ee hoos ku yaal.

$\frac{2 \cdot 3}{2} = \frac{3}{1}$ $\qquad$ $\frac{2 + 3}{2} = \frac{5}{2}$

$\frac{a \cdot b}{a} = \frac{b}{1}$ Haddii $a \neq 0$. $\qquad$ $\frac{a + b}{a} = \frac{a + b}{a}$

a iyo b waa isirrada sarreeyaha. Jajabka waa la fududayn karaa waayo a waxay tahay isir ay wadaagaan sarreeyaha iyo hooseeyuhu.

Haddii $a \neq 0$.

a iyo b midna maaha isirrada sarreeyaha. Jajabkanna lama fududeyn karo, waayo ma jiro isir ka dhaxeeya ama ay wadaagaan sarreeyaha iyo hooseeyuhu 1 iyo — 1 mooyee.

Tusaale 3

Waxaad ku qortaa run ama been jajabka soo socda:

b) $\frac{am}{a} = \frac{m}{1} = m$ haddii $a \neq 0$ (Run)

t) $\frac{m+n}{n} = m + 1$ haddii $m \neq 0$ (Been)

Tusaalayaasha 3 (b) iyo 3 (t) waxay raacsan yihiin xeerka sare waayo 3 (b) waxay run ku noqotay a iyo m waa isirro kolkaas sareeyaha iyo hooseeyuhu waxay leeyihiin isir ay wadaagaan oo ah a. 3 (t) waa been waayo m iyo n waa la isu-geeyey ee maaha isirrada sarreeyaha.

Layli:

I. U qor jajabyadan soo socda sansaanta ugu fudud, u fiirso xannibaadda qiimaha doorsoomayaasha.

1. $\frac{xy}{20x^2y}$
2. $\frac{10mn^2}{15mn}$
3. $\frac{-24mn^2}{30mn}$
4. $\frac{-5x^2y}{-16xy}$
5. $\frac{1-m^2}{m-1}$
6. $\frac{5d-5r}{5d+5r}$
7. $\frac{x^2-16}{x^2-8x+16}$
8. $\frac{5x+10}{x^2+4x+4}$
9. $\frac{m^2n-n}{m^2-1}$
10. $\frac{x^2-4x+4}{y^2-4y+4}$
11. $\frac{2x^2+x-15}{2x^2+11x+15}$
12. $\frac{x^2+x-30}{x^2-8x+15}$
13. $\frac{4x^2+12x+19}{4x^2-9}$
14. $\frac{y^2-6y-54}{y^2-81}$
15. $\frac{x^3+5x^2-2x-24}{x^2+x-6}$

II. Sharax waxayna jajabyadani u ahayn sax:

1) $\frac{x+3}{4x} \stackrel{?}{=} \frac{1+3}{4} = 1$

2) $\frac{9+y}{3+y} \stackrel{?}{=} \frac{9}{3} = 3$

3) $\frac{m-6}{m+6} \stackrel{?}{=} \frac{6-6}{6+6} = \frac{0}{12} = 0$

4) $\frac{4+m^2}{4+m} \stackrel{?}{=} \frac{1+m}{1+1} = \frac{1+m}{2}$

5) $\frac{bx+x}{x} \stackrel{?}{=} \frac{b}{1} = b$

III. U qor jajabyadan sansaanta ugu fudud, adoo u fiirsanaya xannibaadda qiimaha doorsoomaha.

1) $\frac{5x^2-11x+6}{5x^2-x-6}$

2) $\frac{7x^2+x-8}{7x^2-15x+8}$

3) $\frac{6y^3+18y^2+12y}{6y+3y^2-3y^3}$

4) $\frac{5t^3-15t^2-10t}{8t^3-16t^2}$

5) $\frac{6a^3b-6a^2b-36b^3}{8a^3b-8a^2b-48ab^3}$

SAAMI

Haddii la isgarab dhigo inta ka soo baxda labada warshadood ee kalluunka ee Laasqoray iyo Qandala, oo Laasqoray ay soo saarto 15,000 qasacadood maalintii, Qandalana 5,000 oo qasacadood maalintii, waxaan oran karnaa Laas-qoray waxay soo saartaa 3 laabka Qandala. Isgarabdhigga waxa ay soo saaraan labada warshadood waxa lagu helay isuqaybinta labada tiro: $\frac{15{,}000}{5{,}000} = 3$.

Waxa kaloo la oran karaa maalin walba inta labada warshadood soo saaraan waa **Saamiga** 3 ka 1. Waxana loo qoraa 3 : 1. **Saamiga** hal tiro iyo tiro kale waxay tahay qaybta tirada hore oo loo qaybiyey ta dambe. Saami waa isgarab dhig laba tiro, oo loo adeegsado isuqaybin. Saamiga 5 ka 4 waxa loo dhigi karaa sidan oo kale:

1. Isu qaybinta labada tiro iyadoo la adeegsanayo astada qaybta: $5 \div 4$.
2. Isu qaybinta labada tiro iyadoo la adeegsanayo astada Saamiga: 5 : 4.
3. Jajab: $\frac{5}{4}$.

Saamiga 5 : 4 isma garab dhigo uun tirooyinka 5 iyo 4 oo kaliya ee wuxuu isgarab dhigi karaa tirooyinka 10 iyo 8; 15 iyo 12; —25 iyo —20; 5m iyo 4m haddii $m \neq 0$. Taasna waxa lagu helay isticmaalidda astaanta isku dhufashada jajabka. Hase ahaatee haddii xarriiq 2 mitir ah aad garab dhigtid mid 40 santimitir ah, waxa loo baahan yahay in aad u rogtid 2 mitir santimitirro ama 40 santimitir mitirro, dabadeedna aad isu garab dhigtid sida oo kale:

2 mitir = 2x100 santimitir = 200 santimitir.

Kolkaa, saamigu waa $\frac{200 \text{ santimitir}}{40 \text{ santimitir}} = \frac{200}{40} = \frac{5}{1}$ ama 5 : 1.

Marka la isgarab dhigo laba xaddi oo isku jaad ah, waxa cabiraaddooda lagu sameeyaa halbeeg isku mid ha, dabadeedna waxa la raadiyaa saamigooda.

Qeex:

Saami waa isgarabdhig qaybeed oo laba tiro, ama laba xaddi oo isku jaad ah, oo isla halbeeg lagu cabbiray.

Tusaale:

Isku-dhisanaha biyaha saamiga Haydaroojiinka iyo Ogsijiinka cuf ahaan waa 1 : 8. Immisa garaam ayuu mid kasta noqonayaa haddii isku-dhisanaha biyaha cufkiisu yahay 360 garaam?

Furfuris:

1. Dooro doorsoome u taagnaada cufafka loo baahan yahay	n = Cufka Haydarojiin 8n = Cufka Ogsijiin
2. Samayso isle'eg	n + 8n = 360
3. Furfur isle'egta	n + 8n = 360 9n = 360 n = 40 8n = 320
4. Hubi. Saamiga cufkooduna ma yahay	$\frac{40}{320} = \frac{1}{8}$ ama 1 : 8
Cufafka haydarojiin iyo ogsijiin isugeyntoodu ma tahay 360 garaam	n = 40 gr. oo ah Hay/jiin 8n = 320 gr. oo ah Ogsijiin Isugeynta Cufafka 360 gr.

Layli:

I. Saamiyadan u qor sansaanta ugu fudud.

1) 4 : 8

2) 5 : 20

3) $\frac{xy}{xm}$

4) $\frac{amx}{bdx}$

5) $\frac{400}{300}$

6) $\frac{4a}{3b}$

7) 7a : 8a

8) $\frac{8}{8}$

9) $\frac{9m^3}{6m^2}$

10) $\frac{2 \times 5}{5}$

11) $(x^3 + 1) : (x^3 + 1)^3$

12) $(y^2 + 4)^2 : (y^2 + 4)$

13) 5sm ka 20 mitir

14) 10 waqiyadood ka 8 rodol

15) 1 kg. iyo 10 garaam ka 3 kg. iyo 40 garaam

16) 8 bilood ka 3 sannadood

17) Bedka laydi ah 20×24 sm.^{2} ka bedka laydi ah 4×12sm^2

18) Bedka laydi ah 1 fuudh $\times$ 3 fuudh ka bedka laydi ah 8 hiish $\times$ 12 hiish

19) Gabdho iyo wiilal ku jira dugsi qaada 480 arday, oo 200 ay yihiin gabdho

20) Bedka saddexagal salkiisu yahay 1 mitir, joogga qotomaana 8 mitir, iyo bedka saddexagal salkiisu yahay 6 mitir, joogga qotomaana 1200 santimitir.

II. Raadi saamiga x : y ee

1) $5x = 4y$

2) $x = y$

3) $4x - 3y = 0$

4) $6x = 8y$

5) $\frac{3y + 2x}{2x} = \frac{5}{6}$

6) $\frac{x^2 - 3y^2}{y^2} = \frac{3x - 2y}{y}$

BOQOLKIIBA IYO MASALOOYIN BOQOLLEY

Saamiga laba tiro waxa loo qori karaa boqolkiiba inta ay ka noqonayso. Ereyga **Boqolkiiba** waxay u taagan tahay wax **boqol loo qaybiyey** ama boqoleed. Sidaas awgeed, ayaa 4% oo si kale loo qorayey ay tahay 4/100 ama 0.04 . 125% si kale oo loo qoray waxay tahay 125/100 ama 1.25; 1% waxay iyana tahay 1/100. Maxay noqonaysaa 100%? Waxay tahay 100/100 = 1.

Si aad ugu qortid saami boqolley ahaan, waxaad u qortaa saamiga sansaan jajab oo hooseeyuhu yahay 100; dabadeedna qaado sarreeyaha oo ay la socoto astada boqolley.

Tusaale:

U qor tirooyinkan boqolley ahaan:

$$\frac{3}{4} : 0.35$$

Furfuris:

$$\frac{3}{4} = \{\frac{3}{4} \times 100\}\ 1/100 = 75\%$$

$$0.35 = (0.35 \times 100)\ 1/100 = 35\%$$

Boqolley waa tiro le'eg boqolkiiba inta ay ka noqonayso tiro mid kale, oo loo yaqaan sal. Boqolkiiba tiro waxay tahay saamiga boqolley ka salka, waxaanan oran karnaa dulsaar si aynu uga du'no boqolley.

$\frac{\text{Boqolley}}{\text{Sal}}$ = dulsaar ama $\frac{b}{S} = d$ haddii $S \neq 0$.

Tusaale:

Waa imisa 20% ka 40.

Furfuris:

Dulsaar = 20%

Sal = 40

Boqolley = ?

Kolkaas, $b/S = d$; $b = d$

$$b = \frac{20 \times 40}{100} = 8$$

Layli:

I. Raadi boqolleyda tirooyinkan:

1) 8% ee 120
2) 2% ee 100
3) 40% ee 720
4) 90% ee 1,000
5) 25% ee 5
6) 100% ee 65
7) 200% ee 16
8) 160% ee 38
9) 1/5 ee 250
10) .04% ee 200

II. Raadi tirada:

1) 28 waa 12% ee .....
2) 80% tirada ..... waa 128
3) 600% ee tirada ..... waa 600
4) 20 waxay tahay 20% ee tirada .....
5) 100% ee tirada ..... waa 280
6) $\frac{1}{5}$ ee ..... waa 10
7) 150% ee tirada ..... waa 63
8) 56% waa 20% ee tirada .....
9) — ee tirada ..... waa $\frac{3}{2}$
10) 200% ee tirada ..... waa 38

III. Raadi Dulsaarka:

1)	Boqolkiiba	imisa	ayay	ka tahay	96	tirada	480
2)	"	"	"	"	21	"	35
3)	"	"	"	"	4	"	12
4)	"	"	"	"	25	"	250
5)	"	"	"	"	1	"	100

IV. Masalooyinkan furfur

1) Imtixaan arday laga qaaday ayaa 45% ay dhacday. Boqolkiiba imisa ayaa gudubtay. Haddii ardaydu ay ahayd 360, imisa ayaa dhacday. Imisa ayaana gudubtay?

2) Arday ayaa 50 su'aalood ka saxay 40. Walaashiina 30 su'aalood ayay 20 ka saxday. Midkoodba boqolkii imisa ayuu ka saxayaa? Labadooda keebaa calaamad wanaagsanaa?

3) Nin ayaa lacag ka dhintay. Wuxuu uga tagey 10% xannaanada ilmaha agoonta ah, 45% wuxuu uga tagay carruurtiisa, inta hartayna wuxuu yiri dugsi ha lagu dhiso. Boqolkiiba intee bay ahayd inta dugsiga lagu dhisayo? Imisa ayuu carruurta uga tegey, intee xannaanada ilmaha agoonta la siiyey, haddii lacagta uu ka dhintay ay ahayd 120.000 Shilin Somali.

4) Dugsi ayaa 45% ay yihiin gabdho. Haddii dugsiga ay ku jiraan 900 oo arday. Imisa ayaa wiilal ah? Imisaa ayaa gabdho ah?

5) Warshadda hilibka ee Kismaayo ayaa 1972 qali jirtay 52.620 lo'ah. Haddii 60% ay kordhisay, hadda imisa ayay qashaa?

6) Warshadda Kalluunka ayaa waxa loogu talagalay tacab ah 5.000 oo tan oo kalluun ah. Haddii 75% ay kordhisay waa imisa tacabkeedu hadda?

7) Warshadda dharka ee Balcad ayaa soo saartay 9.5 malyuun oo yaardi oo dhar ah. Haddii ay kordhisay soo saarigda 95% hadda maxay soo saartaa?

8) Warshadda Khudradda ee AIgooye ayaa kordhisay tacabkeeda. Haddii ay inta loogu tala galay ay ahayd 4.500 oo tan laakiin markii ay kordhisay tacabku uu noqday 6.000 oo tan. Boqolkii imisa ayaa ku kordhay?

9) Warshadda Shiidda Masaggada ayaa sannadka bilowgiisa shiidday 240 tan. Sannadka dhammaadkiisii waxay gaadhay in ay shiiddo 480 tan. Imisa ayaa boqolkiiba ku korodhay?

10) Warshadda Caanaha ee Xamar waxay 95% kordhisay soo saaridda caanaha. Hadda waxay soo saartaa 250,000 qarsho maalintii. Imisa ayay ka biloeday?

ISKU DHUFASHADA IYO ISU QAYBINTA JAJAB

Iskudhufashada jajab

Marka aan haysanno isle'egta $\frac{xy}{mn} = \frac{x}{m} \cdot \frac{y}{n}$ waxaan naqaan in dhinaca bidixda ee isle'egtu ay had iyo jeer le'eg tahay dhinaca midigta taas waxa innooga cad xeerka isku dhufashada ee jajab haddii $m \neq 0$. $n \neq 0$.

$\frac{x}{m} \cdot \frac{y}{n} = \frac{xy}{mn}$ Marka laba jajab la isku dhufto, tarantoodu waxay tahay jajab sarreeyihiisu yahay taranta sarreeyeyaasha labada jajab, hooseeyihiisuna taranta hooseeyeyaasha labada jajab.

Tusaale:

1) $\frac{x+2}{x-3} \cdot \frac{x-4}{x+3} = \frac{(x \quad (x-4)}{(x \quad 3)(x+3)} = \frac{x^2 - 2x - 8}{x^2 - 9}$

2) $15y \cdot \frac{3y}{x} = \frac{15y}{1} \cdot \frac{3y}{x} = \frac{45y^2}{x}$

Taran jajab oo aan ku qornayn tibixda ugu yar, waxa loo sii fudaydin karaa sidan oo kale.

1) $\frac{m}{y} \cdot \frac{y}{m} = \frac{my}{ym} = \frac{my}{my} = 1$

2) $\frac{x-y}{x+y} \cdot \frac{x+y}{8} = \frac{(x-y)(x+y)}{8(x+y)} = \frac{x-y}{8}$

Isku dhufashada jajabyo waxaan ku fududayn karnaa haddii aan isireynno kuwa allaale kuwii suurtooba.

$$\frac{4x+4}{3x+2} \cdot \frac{9x^2-4}{x^2-x-2} = \frac{4(x+1)}{(3x+2)} \cdot \frac{(3x+2)(3x-2)}{(x-2)(x+1)}$$

$$= \frac{4(x+1)(3x+2)(3x-2)}{(3x+2)(x-2)(x+1)}$$

$$= \frac{4(3x-2)}{x-2} = \frac{12x-8}{x-2}$$

Layli:

Raadi taranta tibxahan soo socda:

1) $\frac{3}{15} \cdot \frac{5}{8} \cdot \frac{24}{27}$

2) $\frac{m}{y} \cdot \frac{y}{c} \cdot \frac{c}{m}$

3) $\frac{mn}{tw} \cdot \frac{t}{m} \cdot \frac{w}{n}$

4) $\frac{5y}{16x} \cdot \frac{32x}{15y}$

5) $\frac{x-y}{9} \cdot \frac{18}{x+y}$

6) $\frac{x^2-3x+2}{2x} \cdot \frac{4x}{x-2}$

7) $x^2+6x+8 \,.\, 2x-4$

8) $\frac{y^2-5y-24}{y^2+7y+12} \cdot \frac{y+4}{y-8}$

9) $\frac{3x^2+6x+4}{x^2-3x-40} \cdot \frac{8-x}{3x+2}$

10) $\frac{2x^2-50}{2x+6} \cdot \frac{x^2-9}{x+5} \cdot \frac{1}{x^2-8x+2}$

Isu qaybinta jajab

Qaybin waxa loo qori karaa taranta la qaybshe iyo rogaalka qaybshe, sidan oo kale:

$a \div b = a \times \frac{1}{b} = \frac{a}{b}$; haddii $b \neq 0$.

Tilmaan:

1) $6 \div 3 = 6 \times \frac{1}{3} = \frac{6}{3} = 2$

2) $12 \div \frac{1}{4} = 12 \times \frac{4}{1} = 12 \times 4 = 48$

3) $\frac{3}{5} \div \frac{2}{3} = \frac{3}{5} \times \frac{3}{2} = \frac{9}{10}$

Haddii aad haysatid laba jajab oo aad doonaysid inaad isu qaybisid waxaad u qortaa qaybshaha rogaalkiisa, dabadeedna adeegso astaanta isku dhufashada jajabyo.

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{ad}{bc} \text{ haddii } c \neq 0, d \neq 0.$$

Rogaalka $\frac{c}{d}$ wuxuu yahay $\frac{d}{c}$.

Tusaale:

$$\frac{t^2 - 16}{t - 3} \div \frac{t^2 - 8t + 16}{3 - t}$$

$$= \frac{(t + 4)\ (t - 4)}{t - 3} \cdot \frac{3 - t}{t^2 - 8t + 16}$$

$$= \frac{(t + 4)\ (t - 4)\ (3 - t)}{(t - 3)\ (t^2 - 8t + 16)}$$

$$= \frac{(t + 4)\ (t - 4)\ (3 - t)}{(t - 3)\ (t - 4)\ (t - 4)}$$

$$= \frac{(t + 4)\ (3 - t)}{(t - 3)\ (t - 4)}$$

$$= \frac{-1\ (t - 3)\ (t + 4)}{(t - 3)\ (t - 4)}$$

$$= \frac{-1\ (t + 4)}{t - 4} = \frac{-t - 4}{t - 4}$$

Layli:

Isu qaybi kuwa soo socda:

1) $\frac{3}{7} \div \frac{11}{14}$

2) $\frac{a}{b} \div \frac{a}{b^2}$

3) $\frac{13r^2}{20a^2} \div \frac{39r^3}{5a}$

4) $\frac{a - b}{4} \div \frac{a - b}{2}$

5) $\frac{m^2 - n^2}{mn} \div \frac{m - n}{m}$

6) $\frac{x}{x^2 - 4x + 4} \div \frac{1}{x - 2}$

7) $\frac{m^2 - n^2}{9m^2\ n^2} \div \frac{3m - 3m}{mn}$

8) $\frac{2x + 4}{3x + 9} \div \frac{4x + 8}{5x + 15}$

9) $\frac{3x + 5}{x^2 + 6x + 9} \div \frac{3x^2 + 8x + 5}{x^2 - x - 12}$

10) $\frac{x^2 + y^2}{x^2 - y^2} \div \frac{x^2 + xy^2}{x^2 - 2xy + y^2}$

Jajabyo isugu jira iskudhufasho iyo isuqaybin.

Marka la isku dhufanayo ama la isu qaybinayo jajabyo isugu jira iskudhufasho iyo isuqaybin ay ka maqan yihiin bilo, waxa la raacaa xeerka iskudhufashada iyo isuqaybinta ee jajabyada. Waxa kaliya ee loo baahan yahay waxay tahay in lagu beddesho jajab rogaalkiisa marba haddii uu ka dambeeyo astada isuqaybinta. Kolkaas jajabyadaasi waa qaar la isku dhufan karo.

Tusaale:

$$\frac{(y + 1)^2}{15} \times \frac{5}{y + 1} \div \frac{y + 1}{3}$$

$$= \frac{(y + 1)^2}{15} \times \frac{5}{y + 1} \times \frac{3}{y + 1}$$

$$= \frac{(y + 1)^2\ (5)\ (3)}{(y + 1)\ (y + 1)\ (15)} = 1$$

Hubi marka $y = 2$.

Layli:

Isku dhufo ama isu qaybi dabadeedna hubi adoo adeegsanaya tabta ku beddelidda:

1) $\frac{3}{x^2} \cdot \frac{x^2}{5} \div \frac{6}{xy}$

2) $\frac{a^2d}{c} \cdot \frac{c3}{a3} \div \frac{b^2d}{d}$

3) $\left(\frac{a^2 - b^2}{a^2}\right) \cdot \left(\frac{a+b}{a-b}\right) \div \frac{a^2 + 2ab + b^2}{a5}$

4) $\frac{x^2 + 10x + 25}{x^2 + 10x} \cdot \frac{10x}{x^2 + 15x + 50} \div \frac{x+5}{x+10}$

5) $\frac{3a^3}{3a + c} \div \frac{9a^2}{9a^2 - c^2} \cdot \frac{3ad}{3a^2 - ac}$

ISUGEYNTA IYO KALA GOYNTA JAJAB

Isugeynta jajabyo leh hooseeye isku mid ah:

U fiirso wadarta $\frac{a}{b} + \frac{c}{b}$. Waxaan naqaan in $\frac{a}{b} = a \cdot \frac{1}{b}$, $\frac{c}{b} = c \cdot \frac{1}{b}$ kolkaas innaga oo adeegsanayna xeerka kala dhiga isku dhufashada waxaana helnaa

$$\frac{a}{b} + \frac{c}{b} = a \cdot \frac{1}{b} + c \cdot \frac{1}{b}$$

$$= (a + c) \cdot \frac{1}{b}$$

$$= \frac{a+c}{b}$$

Xeerka Isugeynta Jajabyo:

Wadarta jajabyo leh hooseeyeyaal isku mid ahi waxa ay tahay jajab sarreeyihiisu yahay wadarta sarreeyeyaasha jajabyada, hooseeyihiisuna yahay hooseeyaha ay wadaagaan jajabyadu.

Tusaale:

1) $\frac{4}{9} + \frac{7}{9} - \frac{y}{9} = \frac{4 + 7 - y}{9} = \frac{11 - y}{9}$

2) $\frac{5}{m+n} + \frac{m}{m+n} - \frac{m-n}{m+n} = \frac{5+m-m+n}{m+n} = \frac{5+n}{m+n}$

Mararka qaarkood waxaad heshaa wadar la sii fududayn karo.

$$\frac{7a}{a^2 - b^2} - \frac{5a + 4b}{a^2 - b^2} + \frac{2b}{a^2 - b^2} = \frac{7a - (5a + 4b) + 2b}{a^2 - b^2}$$

$$= \frac{7a - 5a - 4b + 2b}{a^2 - b^2}$$

$$= \frac{2a - 2b}{a^2 - b^2} = \frac{2(a - b)}{(a + b)(a - b)}$$

$$= \frac{2}{a + b}$$

L a y l i:

1. $\frac{4}{15} - \frac{8}{15} - \frac{7}{15}$

2. $\frac{3}{50} - \frac{29}{50} + \frac{1}{50}$

3. $\frac{12a}{5r} - \frac{2a + 5}{5r}$

4. $\frac{3b + 5}{7} + \frac{2 - 3b}{7}$

5. $\frac{2xy}{x + y} + \frac{x^2 + y^2}{x + y}$

6. $\frac{2x}{x^2 - x - 2} - \frac{x + 2}{x^2 - x - 2}$

7. $\frac{14a}{b^2 - 16} - \frac{2a + a^2}{b^2 - 16}$

8. $\frac{5 - b}{a^2 + 3a - 4} - \frac{b^2 - 3}{a^2 + 3a - 4}$

9. $\frac{x^2 + 2x + 1}{(x + 1)^2} + \frac{3x^2 + 6x + 3}{(x + 1)^2}$

10. $\frac{42b^2 + 16ab}{t(a^2 + 2ab + b^2)} + \frac{8ab + 24a^2}{t(a^2 + 2ab + b^2)} + \frac{24ab}{t(a^2 + 2ab + b^2)}$

Isugeynta jajabyo leh hooseeye kala duwan

Marka la isugeynaayo $\frac{4}{45}$ iyo $\frac{7}{24}$, waxaan raadinnaa jajabyo u dhigma oo leh hooseeyeyaal isle'eg, dabadeetana waan isugeynaa. Abyoone kasta oo isirradiisa ay ka mid yihiin, 45 iyo 24 wuxuu inna siiyaa hooseeyaha ay iskaga mid yihiin, hase ahaatee waxa ugu habboon in aan raadinno hooseeyaha ugu yar ee wadaagaan (H.Y.W.). Si loo helo hooseeyaha ugu yar ee wadaagaan waxa habboon in la raadiyo dhufsana yaraha ay wadaagaan labada hooseeye iyada oo la qorayo labada hooseeye isirradoooda mutuxan.

$$45 = 3^2 \times 5 \qquad 24 = 3 \times 2^3$$

Hooseeye yaraha ay wadaagaan (H. Y. W.) 45 iyo $24 = 2^2 \times 3^2 \times 5 = 360$. Si kolkaa loogu dhigo jajabyada kuwa leh hooseeye 360, waxaan u qornaa sidan oo kale:

$\frac{4}{45} = \frac{4 \times 8}{45 \times 8} = \frac{32}{360}$ Mar kasta waxaan ku dhufannaa 1, waayo $\frac{8}{8} =$ 1. Sida 8da loo helayaa waxay tahay; 360 ayaan u qaybinnaa 45 oo ah hooseeyaha.

$\frac{7}{25} = \frac{7 \times 15}{24 \times 15} = \frac{105}{360}$ Sidii ta hore ayaan tanna ku dhufanaa 1 waayo $\frac{15}{15} =$ 1. Sida 15ta loo heleyna waxay tahay innaga oo 360 u qaybinnay 24 oo ah hooseeye.

Labadii jajab ee aan isugeynnay waxay u dhigmaan $\frac{32}{360}$ iyo $\frac{105}{360}$

$$\frac{4}{45} + \frac{7}{24} = \frac{32}{360} + \frac{105}{360} = \frac{32 + 105}{360} = \frac{137}{360}$$

Tusaale:

$$\frac{x+2}{x^2+3x+2} + \frac{1}{x^2+x} - \frac{3}{x^2+2x}$$

Farfaris:

Raadi hooseeyaha yar ee ay wadaagaan

$$x^2+3x+2 = (x+2)(x+1)$$
$$x^2+x = x(x+1)$$
$$x^2+2x = x(x+2)$$

1. **Qaado isir kasta tirada ugu badan ee uu ka muuqdo hooseeyaha H. Y. W. waa** $x(x+2)(x+1)$
2. **Qoro jajabyada iyada oo hooseeyaasha ay ka muuqdaan isirradoodu.**

$$\frac{x+2}{(x+2)(x+1)} + \frac{1}{x(x+1)} - \frac{3}{x(x+2)}$$

3. **Ku beddelo jajab kasta mid u dhigma.**

$$\frac{x(x+2)}{x(x+2)(x+1)} + \frac{1(x+2)}{x(x+2)(x+1)} - \frac{3(x+1)}{x(x+2)(x+1)}$$

4. **Isugeyso jajabyada, fududeena**

$$\frac{(x+2)x+1(x+2)-3(x+1)}{x(x+2)(x+1)} = \frac{x^2+2x+x+2-3x-3}{x(x+2)(x+1)}$$

$$= \frac{x^2-1}{x(x+2)(x+1)} = \frac{(x+1)(x-1)}{x(x+2)(x+1)} = \frac{x-1}{x(x+2)} = \frac{x-1}{x^2+2x}$$

Hubi haddii $x = 2$.

Layli

I. **Raadi hooseeye yaraha ay wadaagaan (H. Y. W.)**

(1) 6,9 (2) 2,a (3) 10,4

(8) 3,b (5) x,xy,y (6) a,b,ab

(7) $x^2-y, y-x$ (8) $x^2, x+y$ (9) $c-b, b-c$

(11) $x^2+3x, x \div 3, x+1$

II. **Raadi wadarta jajabyadan**

1. $\frac{a}{a+b} - \frac{b}{a^2-b}$ 2. $\frac{4x}{x+4} + \frac{2x}{x+3}$ 3. $\frac{1}{r^2-s^2} + \frac{1}{r-s}$

4. $\frac{3t}{t+2} + \frac{5t}{t+3}$ 5. $\frac{x}{x^2-9} + \frac{3}{x+3} + \frac{3x}{x^2-x}$ 6. $\frac{4b}{a} - \frac{1}{2}$

7. $\frac{3}{a^3} - \frac{2}{a^2} - \frac{1}{a}$ 8. $\frac{2x-5}{2-x} + \frac{x}{2x-4}$ 9. $\frac{x}{ab^2} + \frac{y}{a^2b}$

10. $\frac{5ax}{24} + \frac{8by}{36}$

TIBAAXO ISKU DHAFAN

Tiro isku dhafan oo isugu jirta jajabyo iyo tiro idil waxay wax ka sheegtaa wadarta abyoone iyo jajab. Marka aynu u beddelayno jajab dhafan mid ma qummane ah, waxan tiradaa abyoon u qornaa jajab hooseeyihiisu yahay 1. Markaas ayaan labada jajab ee hooseeyaha kala duwan leh isu geynaa.

TILMAAN.

$$3\frac{1}{8} = \frac{3}{1} + \frac{1}{8} = \frac{24}{8} + \frac{1}{8} = \frac{25}{8}$$

Wadarta ama faraqa tibxaale iyo jajabyo waxa loo yaqaan tibxo isku dhafan. Tibix isku dhafan waxa lagu qori karaa jajab soocan.

1. $x + \frac{2}{x} = \frac{x}{1} + \frac{2}{x} = \frac{x^2}{x} + \frac{2}{x} = \frac{x^2-2}{x}$

2. $3 - \frac{a+b}{a-b} = \frac{3}{1} - \frac{a+b}{a-b} = \frac{3(a-b)}{(a-b)} - \frac{a+b}{a-b}$

$$= \frac{3(a-b)-(a+b)}{(a-b)} = \frac{3a-3b-a-b}{(a-b)} = \frac{2a-4b}{a-b} = \frac{2(a-2b)}{a-b}$$

Haddii sarreeyuhu uu yahay tixbaale, waxaan u beddelan karnaa tibxo isku dhafan adoo isu qaybinaya sarreeyaha iyo hooseeyaha.

1) $\frac{5x^2-3x}{5x} = \frac{5x^2}{5x} - \frac{3x}{5x} = x - \frac{3}{5}$

2) $\frac{3x^2+2x-5}{x+1} = 3x-1 - \frac{4}{x+1}$ waxaad isticmaali kartaa qaybta dheer

$$\begin{array}{r|l} x+1 & 3x-1 \\ & 3x^2+2x-5 \\ & \underline{3x^2+3x} \\ & -x-5 \\ & \underline{-x-1} \\ & -4 \end{array}$$

3) $\frac{a^2+7a+8}{a+1} = a+6 + \frac{2}{a+1}$

$$\begin{array}{r|l} a+1 & a+6 \\ & a+7a+8 \\ & \underline{a^2+a} \\ & 6a+8 \\ & \underline{6a+6} \\ & 2 \end{array}$$

Layli:

I. U qor jajabyadan dhafan jajab soocan.

(1) $3\ \frac{3}{4}$ (2) $-6\frac{3}{5}$ (3) $5\ \frac{1}{3}$

(4) $-3\frac{1}{8}$ (5) $a+\frac{31}{3b}$ (6) $x-\frac{6}{7y}$

(7) $3+\frac{x}{y-5}$ (8) $4-\frac{d}{m+5}$ (9) $6+\frac{m}{n}$

II. Jajab kasta ka dhig mid isku dhafan

(1) $\frac{y^2+x}{y}$ (2) $\frac{x^2+3x+2}{x}$ (3) $\frac{xy+y+r}{y}$

(4) $\frac{x^3+6}{x}$ (5) $\frac{m^2+4m+8}{m}$ (6) $\frac{1284}{17}$

(7) $\frac{284}{15}$ (8) $\frac{15^3+10}{5x}$ (9) $\frac{6-2x^2}{3x}$

(10) $\frac{4m^3+2}{4m^3}$ (11) $\frac{x^2+3x+2}{x+1}$ (12) $\frac{4a^2b+8ab}{4a^2b^2}$

(13) $\frac{a^2+6a+9}{a+2}$ (14) $\frac{81-t^6}{3t^2}$ (15) $\frac{x^3+4x^2+8x+5}{x^2+3x+5}$

JAJABYO KAKAN

Jajab kakan waa jajab sarreeyihiisu iyo hooseeyihiisu ay ka kooban yihiin hal ama wax ka badan oo jajabyo ah.

Tusaale:

$$\frac{\frac{3}{4}}{\frac{6}{8}}$$

Si jajabkan kakan aan uga dhigno mid fudud waxaa loo baahan yahay in aan fahamno in ay la mid tahay qayb la isu qaybinayo laba jajab: ka sarreeyaha ah oo loo qaybinayo ka hooseeyaha ah.

Kolkaas waxan u qoran karnaa:

$$\frac{\frac{3}{4}}{\frac{6}{8}} = \frac{3}{4} \div \frac{6}{8} = \frac{3}{4} \times \frac{8}{6} = \frac{24}{24} = 1$$

Tabta hadda aan isticmaalnay waxay ku tusaysaa in jajabka kakan loo qoro qaybinta laba jajab, dabadeedna la isu qaybiyo. Tab kale oo la isticmaalo marka aynu rabno in aan ka dhigno jajab mid fudud, waxaan adeegsannaa asal madoorshaha isku dhufashada, kaasoo jajab hal ah aan ku dhufanno sarreeyaha iyo hooseeyaha. Si loo helo jajabkaas ah hal, waxaan raadinnaa hooseeye yaraha ay wadaagaan labada hooseeye ee jajabka kore iyo ka hoose.

$\dfrac{\frac{3}{4}}{\frac{6}{8}}$, 4 iyo 8 waa labada hooseeye ee jajabka hore iyo ka hoose, kolkaas H.Y.W. waa 8.

$$\frac{\frac{3}{4}}{\frac{6}{8}} \times \frac{8}{8} = \frac{\frac{3}{4} \times 8}{\frac{6}{8} \times 8} = \frac{6}{6} = 1$$

Tusaale:

$$\frac{\frac{x-4}{3x^2}}{\frac{2x+1}{6x}}$$

Furfuris Tabta I.

$$\frac{\frac{x-4}{3x^2}}{\frac{2x+1}{6x}} = \frac{x-4}{3x^2} \div \frac{2x+1}{6x}$$

$$= \frac{x-4}{3x^2} \times \frac{6x}{2x+1}$$

$$= \frac{(x-4)\,6x}{3x^2\,(2x+1)} = \frac{2\,(x-4)}{x\,(2x+1)}$$

Tabta II.

H.Y.W. labada hooseeye ee jajabyadu waa $6x^2$

$$\frac{\frac{x-4}{3x^2}}{\frac{2x+1}{6x}} \times \frac{6x^2}{6x^2} = \frac{\frac{x-4}{3x^2}\,(6x^2)}{\frac{2x+1}{6x}\,(6x^2)} = \frac{2\,(x-4)}{x(2x+1)}$$

Layli:

Fududee jajabyadan kakan.

(1) $\dfrac{\frac{6}{7}}{\frac{8}{9}}$ (2) $\dfrac{\frac{24}{30}}{\frac{16}{35}}$ (3) $\dfrac{\frac{x}{y}}{\frac{x^2}{y^2}}$

(4) $\dfrac{\frac{x^2}{y^2}}{\frac{x}{y}}$ (5) $\dfrac{\frac{8t^2}{4m^2}}{\frac{16t^2}{8m}}$ (6) $\dfrac{\frac{x+3}{3x}}{\frac{x-3}{x}}$

(7) $\dfrac{\frac{m-n}{n}}{\frac{m+n}{3n}}$ (8) $\dfrac{\frac{2}{x-1} + \frac{x-1}{x+1}}{1 + \frac{x+1}{x-1}}$ (9) $\dfrac{\frac{r^2-9s^2}{6rs}}{\frac{r^2+3s^2}{2rs}}$

(10) $\dfrac{\frac{3}{8}+\frac{1}{4}}{\frac{1}{6}-3}$ (11) $\dfrac{\frac{x+y}{x^2+y^2}-\frac{1}{y}}{\frac{x+y}{x^2y^2}-\frac{1}{x}}$ (12) $\dfrac{\frac{x}{y}-1}{\frac{x}{y}+1}$

(13) $\dfrac{m-5}{m+5}-1$ (14) $1+\dfrac{1}{b+\frac{1}{b}}$ (15) $1+\dfrac{1}{2+\frac{1}{3}}$

JAJAB KU JIRA WEEDHO FURAN IYO MAS'ALOOYIN:

Weedho furan oo hogaleyaal jajab ah leh:

Tabihii hore ee aan u soo baranay si loo furfuro weedho furan iyo tabaha la isticmaalo marka jajab aan fududeyneyno ayaa la adeegsadaa haddii horgalayaasha weedho furan ay yihiin jajabyo:

T u s a a l e:

Furfur isle'gtan $\dfrac{6x}{4}+\dfrac{x+4}{10}=2$

Dariiqada Koowaad: Waxa habboon in aad raadiso hooseeye yaraha ay wadaagaan hooseeyeyaasha tibxuhu, dabadeedna aad ku dhufatid tibix kasta oo is' egta ku jirta.

H.Y.W. 4 iyo 10 waa 20

$$\frac{6x}{4}+\frac{x+4}{10}=2$$

$$\frac{20(6x)}{4}+\frac{20(x+4)}{10}=20(2)$$

$$30x+2x+8=40$$

$$32x=32$$

$$x=1$$

Dariiqada Labaad: Waxaad raadisaa H. Y.W. hooseeyeyaasha tibxuhu. Dhinaca bidixda isku hooseeye ka dhig, dabadeedna hooseeyahaa labada dhinacba ku dhufo.

$$\frac{6x}{4}+\frac{x+4}{10}=2$$

$$\frac{30x}{20}+\frac{2(x+4)}{20}=2$$

$$\frac{30x+2x+8}{20}=2$$

$$30x+2x+8=40$$

$$32x+8=40$$

$$32x=32$$

$$x=1$$

L a y l i:

1. Waxaad sheegtaa H.Y.W. dabadeetana qor weedha furan ka dib markii aad ku dhufatid tibixaha H.Y.W.

T i l m a a n:

$$\frac{3a}{4}+\frac{a}{3}=2 \qquad \text{HWY} = 12$$

$$12\left(\frac{3a}{4}\right)+12\left(\frac{a}{3}\right)=12\ (2)$$

$$9a+4a=24$$

1) $\frac{3x}{5} + \frac{2x}{3} = 6$

2) $\frac{m}{4} + \frac{6m}{7} = 2$

3) $\frac{1n}{6} - \frac{2n}{3} + \frac{1}{5} = n+2$

4) $\frac{y^2}{3} + \frac{2y}{4} = -5$

5) $\frac{11}{6} + \frac{21}{9} - 1 = 4$

II. Furfur Isle'egyadan.

1) $\frac{3x}{2} + 1 = \frac{x}{2}$

2) $\frac{u}{3} + \frac{4u}{3} = 30$

3) $\frac{y}{4} + \frac{y}{2} - 3 = 0$

4) $\frac{x}{3} + \frac{x}{2} + x = 11$

5) $\frac{m}{3} - \frac{m}{6} + 1 = 3$

6) $\frac{5}{3} - \frac{1-x}{6} = 0$

9) $\frac{n}{4} - \frac{n}{8} = \frac{3}{8}$

10) $\frac{y}{6} + \frac{2y}{6} - \frac{4y}{6} = -1$

11) $\frac{2}{3y} - \frac{3}{5y} = 1$

12) $\frac{3x-5}{2} - \frac{x}{3} = 8$

13) $\frac{3x+1}{3} = \frac{3x+2}{2} - \frac{3x-4}{6}$

14) $\frac{4x+1}{3} - \frac{1+x}{2} = \frac{3}{2}$

15) $\frac{1}{3}(3d + 1) - \frac{1}{4}(2d - 1) = \frac{d + 19}{12}$

MASALOOYIN AY KU JIRAAN JAJABYO

Tusaale:

Haddii 60 lagu daro tiro, dabadeedna wadarta loo qaybiyo 2, tirada cusub ee soo baxdaa waxay le'eg tahay tii aad ku bilaawday 3 laabkeed. Raadi tiradii aad haysatay.

Furfuris:

Haddii tirada aan ku bilawnay ay tahay x, marka 60 loo geeyo ee wadarta 2 loo qaybiyo, waxay tahay $\frac{x + 60}{2}$

Tirada cusubi waxay le'eg tahay 3 laabka tii aan ku bilawnay.

$$\frac{x + 60}{2} = 3x$$

Furfur isle'egta si aynu u helno qiimaha x, taas oo ah tiradii aan haysanay awal.

$$\frac{x + 60}{2} = 3x$$

$$x + 60 = 6x$$

$$60 = 5x$$

$$12 = x$$

Hubi:

$12 + 60 = 72$

$\frac{1}{2}$ ka $72 = 36$

36 waa 3 laabka 12.

Tusaale:

Baabuur ayaa in muddo ah socday 30 mayl saacaddiiba. Intaas dabadeed ayuu ka dhigay kaynaanka 40 mayl saacaddiiba si uu u dhammaystiro safarkiisa inta ka hartay. Fogaantii oo dhammi waxay ahayd 180 mayl, waxaana uu ku sameeyey 5 saacadood. Raadi fogaanta uu jaray markuu 30 mayl saacaddiiba ku soday.

Furfuris:

Haddii keynaanka 30ka mayl saacaddiiba uu ku sameeyey x mayl, kolkaa inta saacadood uu socday waxay tahay $\frac{x}{30}$ saacadood.

Safarka inta uga hartay = 180— x, waxaanu ku socday saacaddiiba 40 mayl. Inta saacadood ee uu kaynaankaa ku socday

$$= \frac{180 - x}{40}$$

Safarka oo dhanna wuxuu ku sameeyey 5 saacadood. Kolkaa:

$$\frac{x}{30} + \frac{180 - x}{40} = 5. \quad \text{HYW waa } 120$$

$$120\ \frac{(x)}{30} + 120\ \frac{(180-x)}{40} = 5\ (120)$$

$$4x + 540 - 3x = 600$$

$$4x - 3x = 600 - 540$$

$$x = 60$$

Markaa, 60 mayl ayuu sameeyey intii uu ku socday 30 mayl saacaddiiba.

Hubin:

1. 60 mayl ayuu ku socday 30 mayl saacaddiiba wuxuuna ku qaatay 2 saacadood.
2. Safarka inta ka hartay (180—60) mayl = 120 mayl, wuxuuna ku socday 40 mayl saacaddiiba. Kolkaas waxay ku qaadatay 3 saacadood.
3. Safarka dhammi wuxuu ku qaatay 2 + 3 = 5 saacadood.

Layli:

1. Haddii 40 laga jaro 2/3ka tiro, waxa inoo soo baxa wuxuu le'eg yahay 1/4ka tiradaas. Raadi tirada iyada ah.
2. Waxaan ka fakiraa tiro, waxaan u geeyaa 20, dabadeedna wadarta ayaan u qaybiyaa 6. Kolkaas waxa ii soo baxa waa 10. Raadi tiradaas.
3. Ul dhererkeedu yahay 23 sm ayaa 2 gabal loo qaybiyay si 1/5ka gabal ee ushu u le'ekaato 3/8ka inta kale. Raadi dhererka labada gabal (u fiirso haddii gabal uu yahay x, ka kale waa 23 — x).

4. Haddii nin da'diisu ahayd 56 sano markii wiilkiisu dhashay, immisa sano ka bacdi ayaa da'da wiilku noqonaysaa badhka da'da aabbihiis?

5. Haddii tiro marka laga jaro 15, dabadeedna loo qaybiyo 5 waxa soo baxana loo geeyo 16, aynu helno 25, waxaad raadisaa tirada iyada ah.

6. Raadi labada qaybood ee tirada 24 loo qaybiyo haddii 1/6ka qaybta hore marka loo geeyo 3/4ka qaybta labaad ay inna siiso 11. (U fiirso haddii qaybi tahay x, ta kale waa 24 — x).

7. Baabuur in muddo ah jarayey 25 mayl, saacaddii ayaa ka dhigay kaynaankiisii 40 mayl saacaddiiba. Haddii waqtiga uu ku qaatay laba magaalo oo isu jira 235 mayl ay ahayd 7 saacadood. Intee mayl ayuu sameeyey markii uu ku socday 25 mayl saacaddiiba iyo 40 mayl saacaddii.

8. Cali ayaa haystay lacag ka badan ta Caashi haysatay. Haddii uu dheeraa 60 shilin, waxay lacagta Caashi 1/2keed ay le'eg tahay 1/4ka ta Cali. Midkoodba imisa ayuu haystay?

9. Nin dhugdhugley wata ayaa Xamar ilaa Marka ku socday soddon mayl saacaddiiba. Haddii uu ku socon lahaa afartan mayl saacaddiiba, waxay ku qaadan lahayd in ka yar saacad intii marka hore ay ku qaadan lahayd.

   Waa maxay fogaanta u dhexeysa Xamar iyo Marka?

10. 14 buug ayaa lacagtoodu dhan tahay 58 shilin. Buugagga qaarkood, midkii wuxuu joogaa 5 shilin, kuwa kalena wuxuu midkiiba joogaa 3 shilin. Labada jaad midkiiba intee laga gadan karaa?

ISLE'EGYO JAJABYO AH

Isle'eg sida $\frac{6}{x^2+9} + \frac{1}{x+3} + 1 = 0$ oo hooseeyaha jajabka uu ka muuqdo doorsoome ayaa loo yaqaan isle'eg jajab. Haddii isle'eg jajab aan ku dhufanno tibix kasta hooseeyaha ugu yar ee ay wadaagaan, isle'egta cusub ee inoo soo baxa maaha mid tii hore u dhigmi karta.

Tusaale:

Furfur isle'egtan.

$$\frac{6}{x^2-9} + \frac{1}{x+3} + 1 = 0$$

Furfuris:

$$\frac{6}{x^2-9} + \frac{1}{x+3} + 1 = 0$$

1. HYW hooseeyayaashu waa $x^2 - 9$

2. Tibix kasta ku dhufo HYW $(x^2 - 9)$

$$(x^2-9)\frac{4}{x^2-9} + (x^2-9)\frac{1}{x+3} + (x^2-9)\,1 = 0$$

$$6 + x - 3 + x^2 - 9 = 0$$

$$x^2 + x - 6 = 0$$

$$(x+3)(x-2) = 0$$

$$x + 3 = 0 \quad | \quad x - 2 = 0$$
$$x = -3 \quad | \quad x = 2$$

Marka aad hubisid in $x = -3$ iyo $x = 2$ ay yihiin xididdo waxan aragnaa waxyaabaha soo socda:

Isle'egta oo dhan qoro, dabadeedna ku beddelo qiimayaasha -3 iyo 2.

$$\frac{6}{x^2 - 9} + \frac{1}{x + 3} + 1 = 0$$

Marka $x = -3$,

$$\frac{6}{(-3)^2 - 9} + \frac{1}{-3 + 3} + 1 = ?0$$

$$\frac{6}{9 - 9} + \frac{1}{0} + 1 = ?0$$

$$\frac{6}{0} + \frac{1}{0} + 1 = ?0$$

Jajabka $\frac{6}{0}$ iyo $\frac{1}{0}$ macna ma sameeyaan sidaas awgeed ayaa -3 aanay ugu ahayn isle'egta xidid.

Marka $x = 2$

$$\frac{6}{2^2 - 9} + \frac{1}{2 + 3} + 1 = ?0$$

$$\frac{6}{4 - 9} + \frac{1}{5} + 1 = ?0$$

$$\frac{6}{-5} + \frac{1}{5} + 1 = ?0$$

$$\frac{-6}{5} + \frac{1}{5} + 1 = ?0$$

$$\frac{-6 + 1 + 5}{5} = ?0$$

$$-6 + 1 + 5 = ?0$$

$0 = 0$ haa

Ururka furfuristu waa $\{ 2 \}$.

Markaan isle'egta ku dhufannay $x^2 - 9$ waxaan helnay isle'eg cusub oo aan u dhigmayn tii aan ku bilownay. Isle'egta cusub waxay leedahay xididka -3 waayo tirada lagu dhuftay oo ah $x^2 - 9$ ayaa le'eg ama u taagan eber mar allaale markii x lagu beddelo -3.

Haddii tibixaale lagu dhufto isle'egta, ururka furfurista isle'egta cusub waxa ku jira xididka isle'egtii hore iyo xididdo kale oo tirada lagu dhuftay had iyo jeer eber ka dhiga. Kolkaa waxa habboon in aad ka digtoonaatid.

Marka isle'eg lagu dhufto tibaax leh doorsoome oo noqon karta eber haddii doorsoomaha lagu beddelo tiro waxay kuu soo saartaa isle'egtii hore. Sidaas awgeed ayaa loo baahan yahay in xididdada lagu beddelo isle'egtii hore, si looga bixiyo kuwa aan ururka furfurista ku jirin. Qiimayaasha ku siiya weedhaha runta ayuun baa ku jira ururka furfurista isle'egtaas.

Tusaale:

$$\frac{x}{x + 2} = \frac{4x - 3}{x - 2}$$

Furfurista: Raadi HYW hooseeyaha jajabyada isle'egta.

waa $x^2 - 4$.

Dhinac kasta ku dhufo HYW.

$$(x^2 - 4)\frac{x}{x = 2} = (x^2 - 4)\frac{4x - 3}{x - 2}$$

$$(x - 2)\,x = (x + 2)(4x - 3)$$

$x^2 - 2x = 4x^2 + 8x - 6 - 3x$

$3x^2 + 7x - 6 = 0$

$3x^2 + 9x - 2x - 6 = 0$

$3x(x + 3) - 2(x + 3) = 0$

$(x + 3)(3x - 2) = 0$

$x + 3 = 0$ ama $3x - 2 = 0$

$\therefore x = -3$ ama $x = 2/3$

Haddii aan hubinno waxaaan arkaynaa in labada qiime ee x ay yihiin xididdo. Bal u fiirso tusaalahan iyo tusaalaha 1. Labada xidid ee -3 iyo $2/3$ midna kama dhigo hooseeyaasha eber, oo midna ma aha xidid ay keentay isle'egta cusub ee soo baxday, hase yeeshee waa qaar dhab ah. Hubi adoo beddelaya.

Layli:

(1) $\frac{6}{x+3} = \frac{2}{x+3}$

(2) $\frac{5}{x-2} - \frac{12}{x+3} = 3$

(3) $\frac{4}{9x} + \frac{1}{x} = \frac{1}{18}$

(4) $6x + \frac{2x}{x-1} + 9 = 0$

(5) $\frac{1}{x+1} - \frac{1}{x+3} = \frac{1}{x} - \frac{1}{x+2}$

(6) $\frac{y+2}{3y-6} - \frac{2}{34+6} + \frac{7}{9} = 0$

(7) $\frac{x+2}{x+1} = \frac{x-1}{x+1} + \frac{1}{x^2-1}$

(8) $\frac{1}{x+5} + \frac{4}{2x-1} = \frac{1}{5x+1}$

(9) $\frac{2}{x+5} + \frac{3}{x-5} = 0$

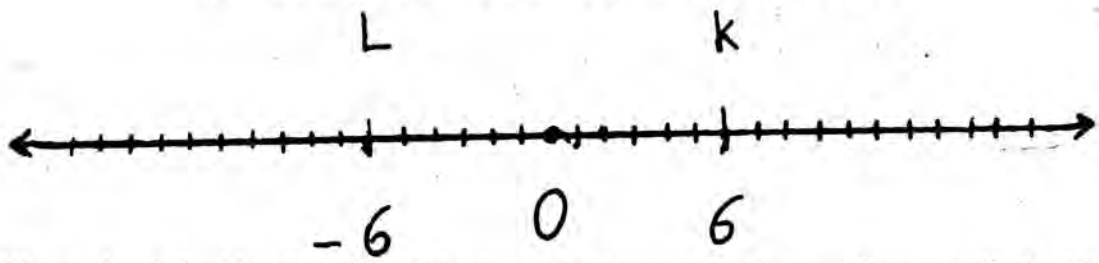
10) $\frac{x+3}{2x+3} + \frac{x+1}{2x-3} = 0$

CUTUB II

QIIME SUGAN

Qeex: Qiimaha sugan ee tiro kasta waa tiro togan waxay doonto tiradu markii hore ha ahaatee.

QIIMAHA SUGAN IYO XARRIIQDA TIRADA



Shaxankani haddaad u fiirsatid waxaad ogaanaysaa inuu yahay xarriiqda tirada. Waxaynu ognahay tirooyinka midig ka xiga unugga 0 in ay yihiin tirooyin togan kuwa bidix ka xigaana ay yihiin kuwo taban.

Haddaad lix tallaabo uga socotid unugga 0 xagga midig waxaad gaadheysaa K oo kulankeedu yahay 6. Markaa waa inaad ogaataa fogaanta L iyo unuggu isu jiraan inay la mid tahay fogaanta K iyo unugga isu jiraan. Haddaba waxaynu oran karnaa qiimaha sugan ee —6 iyo + 6 waa fogaanta L iyo 0 isu jiraan iyo fogaanta K iyo 0 isu jiraan; waana 6.

Asto u go'an baa jirta qiimaha sugan. Taasina waxay tahay laba xarriiqood oo qotoma oo labada hareerood laga mariyo tirada qiimaheeda la doonayo.

Markaa fogaanta L iyo 0 isu jiraan

$$= | -6 | = 6,$$

Fogaanta K iyo 0 isu jiraan

$$= | +6 | = 6$$

Tusaale:

Waxa lagu weydiiyey qiimaha sugan ee doorsoomaha x, markaa x waxay noqon kartaa tiro togan, tiro taban ama eber.

Haddii x ay tahay tiro togan qiimaha sugan ee x, $| x |$, waa x; haddii x ay tahay tiro taban, $| x |$ waa $-x$; haddii ay x tahay eber, $| x |$ waa eber.

Markaa $| x | = x$ haddii $x = 0$ ama $x > 0$

$| x | = -x$ haddii $x < 0$

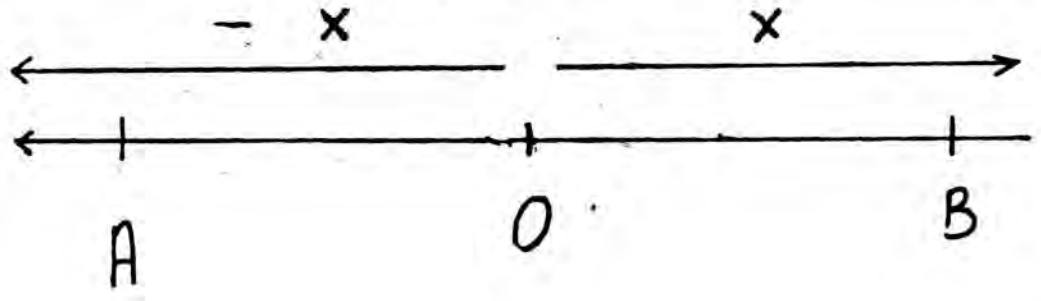
Tusaale:

$| 5 | = 5$

$| -5 | = -(-5) = 5$

$| 10-7 | = | 3 | = 3$

$| 7-10 | = | -3 | = 3$



Shaxanka haddaad u fiirsatid waxaad ogaanaysaa in fogaanta A iyo 0 isu jiraan iyo ta B iyo 0 isu jiraan ay isle'eg yihiin. Markaa, waxaynu oran karnaa $| -x | = | x | = x$.

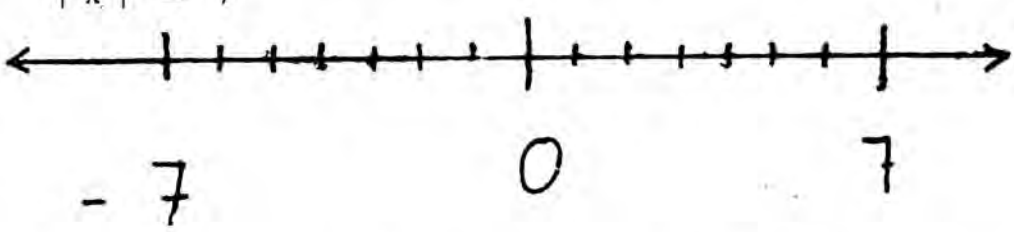
Layli:

Kala sheeg weedha runta ah iyo ta beenta ah:

1) $| -2 | = 2$
2) $| -3 | = +3$
3) $| -7 | = -7$
4) $-| -8 | = 8$
5) $| 8-11 | = -3$
6) $| 7-3 | = 10$
7) $| -5 | - | -5 | = 0$

Tusaale:

$| x | = 7$



Haddii lagu yiraahdo furfur isle'egta $| x | = 7$, waa inaad ogaataa in x leedahay laba qiime. Mar $x = 7$, marna $x = -7$, sababtuna waxay tahay fogaantu waa isku mid haddii toddoba tallaabo loo socdo unugga xaggiisa midig iyo haddii toddoba tallaabo looga socdo unugga xagga bidix.

Ta kale waxaynu ognahay in haddii $x \leqslant 0$ ama haddii $x < 0$ $| x | = -x = 7$

Markaa $x = -7$ ama $x = 7$.

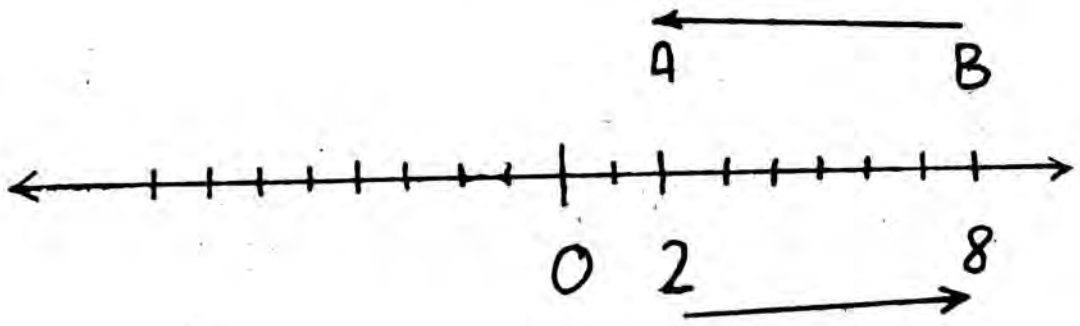
Layli:

Furfur isle'egyadan soo socda:

1) $| y | = 9$
2) $| -a | = 4$
3) $| x | = 0$
4) $3 | b | = 6$
5) $\frac{| n |}{4} = 2$
6) $| d | + 3 = 7$
7) $| x | - 3 = 8$
8) $| t | - | 5 | = 2$
9) $2| t | = | t | + 11$
10) $| x | - | -5 | = 0$

QIIMAHA SUGAN EE FARAQYADA

U fiirso shaxanka



Waxaynu haysannaa labada meelood A iyo B oo kulannaddodu yihiin 2 iyo 8. haddii layna weydiiyo faraqa kulanka labada meelood, laba jawaabood baa suuragal ah:

$8 - 2 = 6$ iyo $2 - 8 = -6$. Faraqa $8 - 2 = 6$ wuxuu ku tusayaa in A laga tegayo oo B la gaaray, faraqa $2 - 8 = -6$ wuxuu ku tusayaa in B laga tegayo oo A la gaaray. Markaa waxaynu oran karnaa fogaanta A iyo B u dhaxeysa waa 6, macnihii waxa weeye $|8 - 2| = |2 - 8| = 6$.

$|8 - 2| = 8 - 2$ haddii $(8 - 2) > 0$

$\therefore |8 - 2| = 6$

$|2 - 8| = -(2 - 8)$ haddii $(2 - 8) < 0$

$= -2 + 8 = 6$

Markaa, guud ahaan

$|x - a| = x - a$ haddii $(x - a > 0$ ama $x > a$

$|x - a| = -(x - a)$ haddii $(x - a) < 0$ ama $x < a$

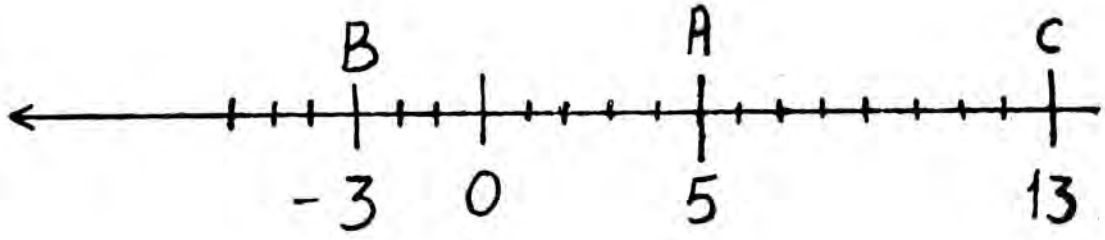
Tusaale:

Furfur

$$|x - 5| = 8$$

Furfurid 1.

$|x - 5| = 8$ u fiirso shaxanka



Macnaha isle'egta waxa weeye fogaanta u dhaxaysa labada meelood ee kulannadoodu yihiin x iyo 5 waxay tahay 8. Markaa 8 tallaabo xagga midig ee A haddii aan u soconno waxaynu gaareynaa C oo kulankeedu yahay 13.

Haddaynu 8 tallaabo xagga bidix ee A u soconno waxaynu gaareynaa B oo kulankoodu yahay — 3. Markaa

$$x = 5 + 8 = 13$$

$$x = 5 - 8 = -3$$

Furfurid 2

$|x - 5| = x - 5$ haddii $x > 5$

Markaa $x - 5 = 8 \quad \therefore x = 13$

$|x - 5| = -(x - 5)$ haddii $x < 5$

Markaa $-(x - 5) = 8$

$\therefore -x + 5 = 8$

$-x = 3$

$x = -3$

Tusaale:

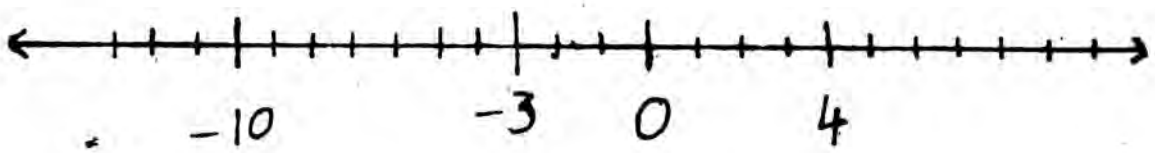
Furfur

$$|x + 3| = 7$$

Furfurid 1

$$|x + 3| = 7 = |x - (-3)|$$

Waxaad haysataa laba meelood oo kulankoodu yihiin x iyo — 3, fogaanta u dhexeysaana tahay 7.



Haddaad kulanka — 3 ka tagtid oo 7 tallaabo xagga bidix u socotid waxaad gaadheysaa kulanka — 10. Macnuhu waxa weeye

$$x = -3 - 7 = -10$$

Ta kale haddaad kulanka — 3 ka tagtid oo 7 tallaabo xagga midig u socotid, waxaad gaadhaysaa kulanka 4.

Taasoo ah $x = -3 + 7 = 4$

Furfurid 2

$| x + 3 | = 7$

$| x + 3 | = x + 3$ haddii $x < 3$

Markaa, $x + 3 = 7$

$x = 4$

$| x + 3 | = -(x + 3)$ haddii $x < -3$

Markaa $-(x + 3) = 7$

$\therefore -x - 3 = 7$

$x = -10$

Layli:

B. Furfur isle'egyada soo socda.

1) $| 5 - x | = 7$

2) $| x - 4 | = 6$

3) $| -5 - y | = 9$

4) $| -(-3) - t | = 3$

5) $| -(4 - m) | = 2$

6) $| -(n + 10) | = 8$

7) $| 2x + 5 | = 2$

8) $| 3x + 7 | = 1$

9) $| 1 + \frac{3}{2} x | = \frac{1}{2}$

10) $| \frac{3x}{4} + 2 | = 6$

T. Furufur isle'egyada soo socda adoo isticmaalaya xarriiqda tirada

1) $| 5 - x | = 3$

2) $| x - (-3) | = 4$

3) $| -2 - x | = 1$

4) $| x - 2 | = 2$

5) $| -y + 4 | = 2$

CUTUB III.

KULANNO SALLAX

XARRIIJIN IYO XARRIIQ

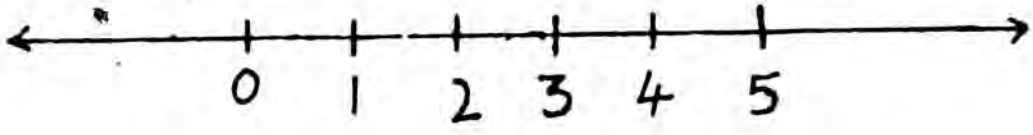
Xarriijin waxay ka kooban tahay baro fara badan oo sanka isku wada haya. Hase yeeshee waxay leedahay laba bar dhammaad.

AB waa xarriijin. A iyo B waa labadii bar dhammaad, Bal ka warran haddii aynu haysanno urur ka kooban baro fara badan, oo aan labada bar dhammaad midna aan lahayn, oo waligood sidaa isu dabajooga. Ururkaas baa la yiraahaa xarriq. Haddaba, sidee baa loo tusaa in aynan xarriiqdu bar dhammaad lahayn? Waxa la jeexaa xarrriijin, labada dhammaadna, waxa lagu sameeyaa midba gammuun.

xarriiq

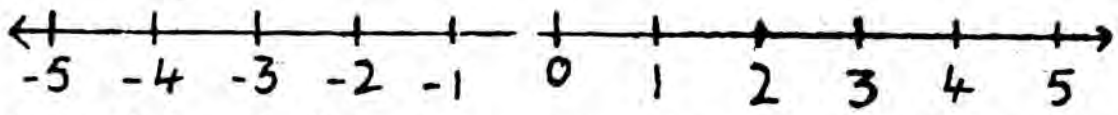
XARRIIQDA TIRADA

Waxaad jeexdaa xarriiq. Bartaad doontid ee ku taalla xarriiqda u qaado bilow, ka soo qaado in ay bartaasi u taagan tahay tirada 0 (eber). Adoo fogaanta aad doontid qaadanaya calaamadee bar kale oo eber ka xigta midig. Bartani ha u taagnaato hal, fogaantii u dhaxaysay eber iyo hal adoo isticmaalaya calaamadee bar kale oo u taagan labo. Isla fogaantii adoo isticmaalaya calaamadee baro u taagan saddex, afar shan, lix ..... Halkaa waxa inooga cad in eber tirooyinka midigta ka xigaa ay yihiin ururka abyooneyaasha togan sida hoos ka muuqata.



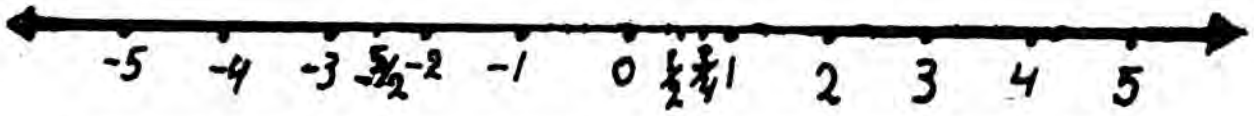
Fogaantii eber iyo hal u dhaxaysay adoo qaadanaya eber xaggiisa bidix ka calaamadee bar. Bartaasi adoo ka tagaya, tu kale oo ka bidixeysa oo isla fogaantii u jirta samee. Sidaa u wad.

Haddaad xasuusan tahay hore waxaynu u niri tirooyinka togan iyo kuwa taban waa isku lid. Markaa, haddii iminka aynu ku bayaaminay abyoneyaasha togan eber midigteeda, waa in baraha eber bidixda ka xiga ee isu jira inta ay isu jiraan 0 iyo 1 noqdaan qaar lid u ah abyooneyasha togan. Maxaa lid u ah abyooneyaasha togan? Abyooneyaasha taban. Halkaa waxa inooga muuqda in xarriiqdaani aynu ku bayaaminay dhammaan ururka abyooneyaasha.



Mar haddii fagaani u dhaxayso laba abyoone oo kasta, waxaynu qayb qaybin karnaa fogaantaa. Markaa habar jajab oo dhan baan sidaa ku muujin karnaa. Taasi waxay ku tusaysaa in iminka tirooyinka lakab oo dhan lagu muujin karo xarriiqdii. Ma kula tahay in lagu muujin karo tirooyinka lakab wax dhaafsan? Labada barood ee ku beegan 3.1 iyo 3.2 haddaad sii qayb-qaybisid waxaad heli bar u taagan tirada loo yaqaan π (bay). Hase yeeshee tiradaasi maaha tiro lakab ee waa tiro lakab la'. Run ahaantii, tirooyinka lakabka la'oo dhan waad ku muujin kartaa xarriiqda.

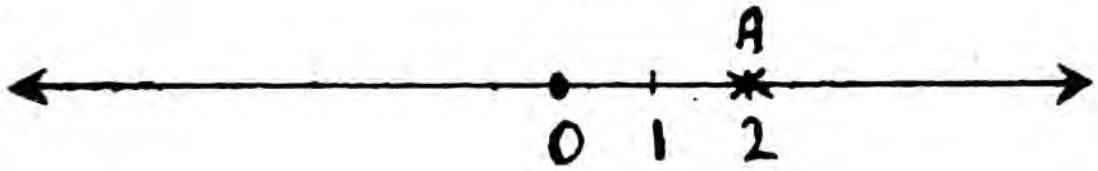
ugu dambeystii waxa inoo caddaatay in xarriiqdii lagu muujin karo dhammaan tirooyinka maangal, kolkaa bar kastaa waxay ku beegan tahay tiro. Sidaa darteed baa xarriiqdan loogu bixiyey xarriiqdii tirada.



Bal ka warran haddii isle'eg lagu siiyo hal doorsoome leh ee lagu yidhaa ku bayaami furufurista xarriiqda tirada.

Tusaale:

$$3x + 1 = 7$$
$$3x = 7 - 1$$
$$3x = 6$$
$$x = 2$$

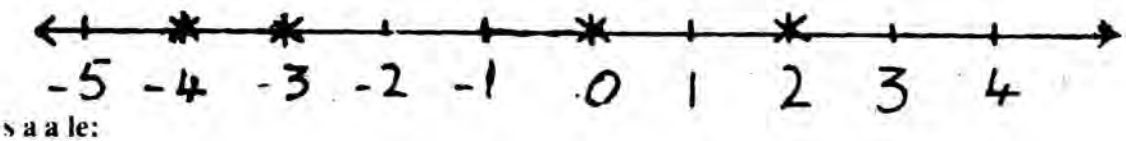


Bartani waxay u taagan tahay 2. Ama waxaad odhan kartaa 2 waxay ku beegan tahay barta A. Tirada bar ku beegan waxa la yiraahaa kulan. Iminka 2 waa kulanka A.

Tusaale:

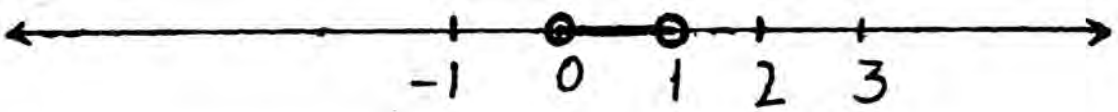
Ururkan ku muuji xarriiqda tirada.

$$\{-4, -3, 0, 2\}$$



Tusaale:

Dhammaan tirooyinka u dhexeeya 0 iyo 1 ku muuji xarriiqda tirada.



Imisa tiro baa u dhexeysa 0 iyo 1? Run ahaantii tirooyin aad u badan baa u dhexeeya 0 iyo 1. Markaa waxa inoo hawl yar innagoo calaamadayna fogaanta u dhexeysa 0 iyo 1. 0 iyo 1 miyay ku jiraan tirooyinka la calaamadeynayo? 0 iyo 1 midna kuma beegna baraha iyaga u dhexeeya. Kolkaa, si loo tuso in ayna ku jirin laba goobo oo yar yar baa lagu sameeyaa baraha ku beegan 0 iyo 1. Labada goobo dhexdooda qalinka lama taabsiiyo. Haddii ay ku jiri lahaayeen, labada goobo gudahooda ayaa la maddobeyn lahaa.

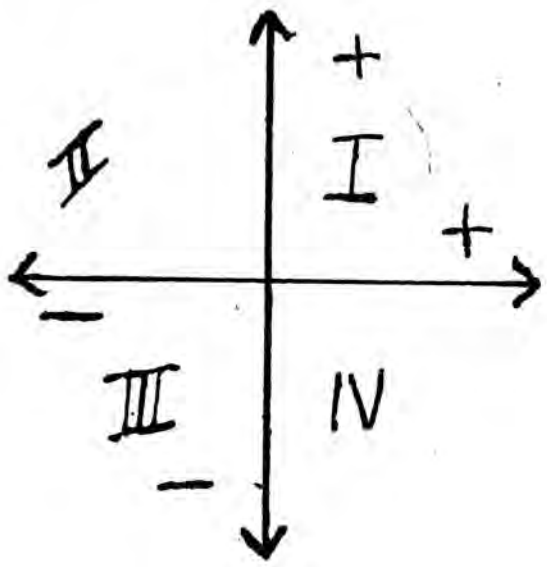
Layli:

Ku muuji xarriiqda tirada

1) Abyooneyaasha togan ee ka yar 9.
2) Dhammaan tirooyinka u dhexeeya 2 iyo 5.
3) Dhammaan tirooyinka u dhexeeya 2 iyo 5, oo ay ku jiraan.
4) $\{-2, 0, +2\}$
5) $\{-3, -2, 1, 4,\}$

DHIDIBBADA KAARTIS

Waxaanu hore u aragnay xarriiqda tirada. Ka soo qaad inaad haysato laba xarriiq tiro. bal mid jiifi, xarriqda kalena ku qotomi ta hore adoo isa saaraya labadooda eber. Ma heshay shaxankan hoos ku yaal oo kale?

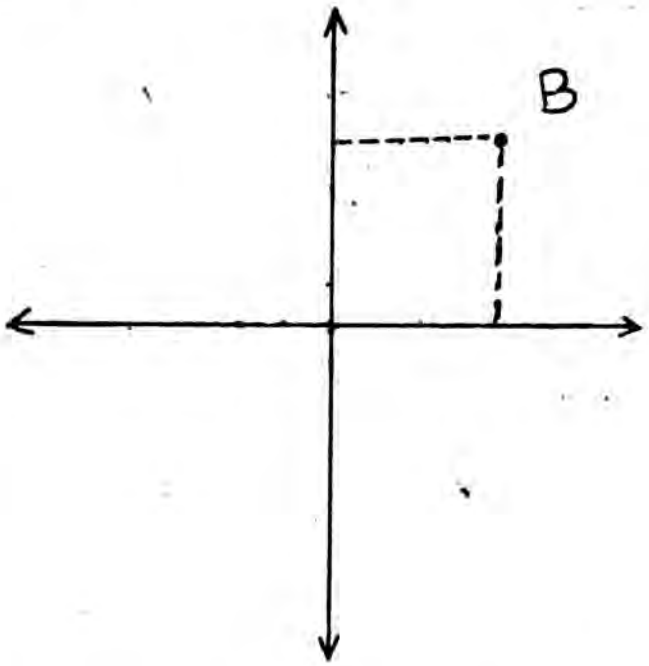


barta ay iska jaraan labada xarriiqood waxa la yidhaa unug. Xarriiqda jiifta waxa la yidhaa dhidibka — x, ta taaganna waxaa la yidhaahdaa dhidibka — y. Labada dhidib waxa la isku yidhaa dhidibbada kaartis ama dhidibka kulanka laydi. Ninkii u horeeyyey ee hindisay laba xarriiq tiro oo sidaa isugu qotoma baa la odhan jiray Dhikaart, sidaa daraadeed baa dhidibbada loo yidhi dhidibbadii kaartis. Sida shaxanka ku bayaansan, dhidibka —x ee midigta unugga waa tiro togan, bidixduna waa tiro taban. Dhidibka — y wixii unugga ka sarreeya waa tiro togan wixii unugga ka hooseeyaana waa tiro taban.

Adoo shaxanka fiirinaya imisa gobol bay dhidibbadu u qaybiyeen xaashida? Afar gobol. Gobolkiiba waxa la yiraahdaa **waax**. Kolkaa afar waaxood baa xaashida loo qaybiyey. Marka la tirinaayo afartaa waxood waxa lagaga bilaabaa waaxda ka samaysanta dhidibka —x ee togan iyo ka y ee togan. Dabadeed waxa loo socdaa lid saacad wareeg.

LAMMAANE HORSAN

Hore waxaynu u nidhi bar kasta oo ku taalla xarriiqda tirada waxay u taagan tahay tiro kaliya, kolkaa tiradaasi baa lagu tilamaamaa bartaa. Iminka ka soo qaad inaad haysato sallaxa ay sameeyaan dhidibbada **Kaartis.** Haddaba barta B ee sallaxa ku bayaansan sidee loo tilmaamayaa? Bal qotome ka soo deji B oo jaraya dhidibka — x. Qotome kale oo jaraya dhidibka — y ka jeex B.



Barta B waxay ku beegan tahay laba tiro oo midi ku taallo dhidibka — x ta kalena ku taallo dhidibka — y. Labada tiro ee ay bartu ku beegan tahay miyaa la wada qorayaa mise mid uun baa la qorayaa? Runtii labada tiraba waa la qorayaa si barta loo tilmaamo. Maxay tiro keliyihi innoogu filaan weydey?

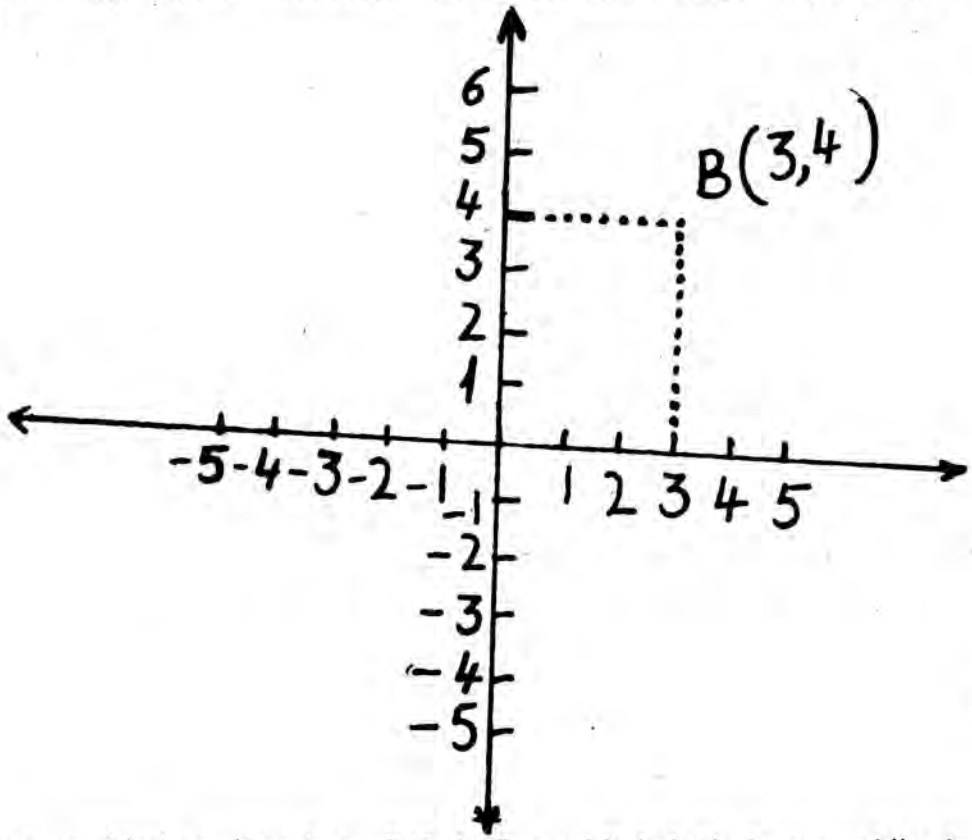
Halkaa waxaynu ka garanay in bar kasta oo sallaxan ku taalla lagu tilmaamayo laba tiro oo midi ka timid dhidibka — x ta kalena ka timid dhidibka — y. Labadaa tiro oo wadajira waxa la yiraa lammaane. Haddaba, lammaanayaasha ma sida la doono baa loo kala horreysiin karaa mise mid uun baa mar walba ka horreysiiyaa?

Run ahaantii, tirada dhidibka — x ka timid baa mar kasta la horreysiiyaa. halkaa waxa ka cad in lammaanayaasha loo qoro si horsan. Kolkaa, bar kasta oo sallax ku taalla waxa lagu tilmaamaa lammaane. Lammaanuhu labada tiro ee horsan uu ka kooban yahay middiiba waxa la yiraa kulan. Kolkaa, kulanka — x baa mar kasta horreeya, kulanka — y-na wuu dambeeyaa. Markaa, sansaanta loo qoro lammaanayaasha horsan waa (x, y).

Lammaane horsan waxa aad loo fahmi karaa, haddii aad u fiirsato sida loo tiriyo "buundooyinka" cayaaraha kubbadda laliska. Haddii siiriwalahu yidhaa 7; 10 markaaba waxaad garanaysaa in qolada kubbadda tuuranaysaa leeyihiin 7 buundo qolada kalena 10 buundo.

BAR DHIGID

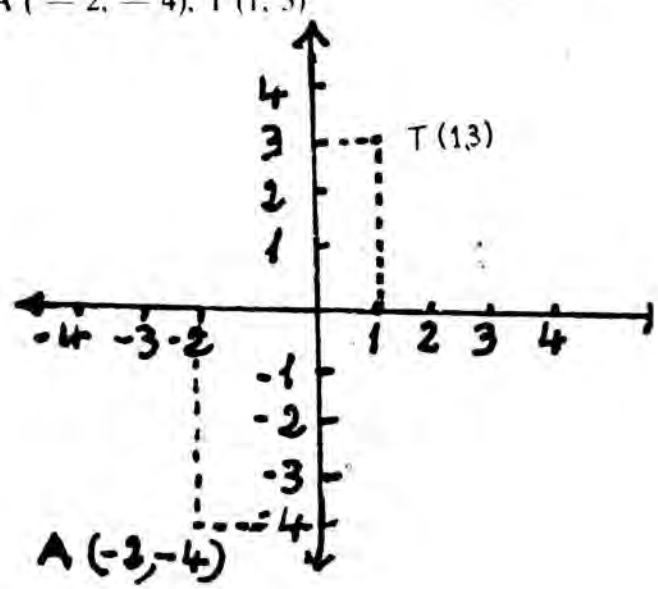
Waataynu gaadhnay in bari leedahay laba kulan. Su'aasha iminka inoò furan waxa weeye, haddii lagu siiyo bar labadeeda kulan, sidee bartaa loogu muujin karaa dhidibbada kaartis?



Ka soo qaad in lagu siiyay barta B (3, 4). Bartani B, kulanka hore waa kii x, ka dembena waa kii y. Kolkaa, 3 waa kulanka x, kulanka — y-na waa 4. Haddaba sidee loogu dhigaa bartan sallaxa? Sida shaxanka ku bayaansan, halka 3 ku beegan ee dhidibka — x ka jeex xarriiq taagan oo barbarro la ah dhidibka y. Haddana, halka 4 ku beegan ee dhidibka — y ka jeex xarriiq jiifta oo barbarro la ah dhidibka — x. Ma aragtaa in ay labada xarriiq isgoynaayaan? Barta ay laba xarriiq iska gooyaan baa tilaamaysa barta B.

Tusaale:

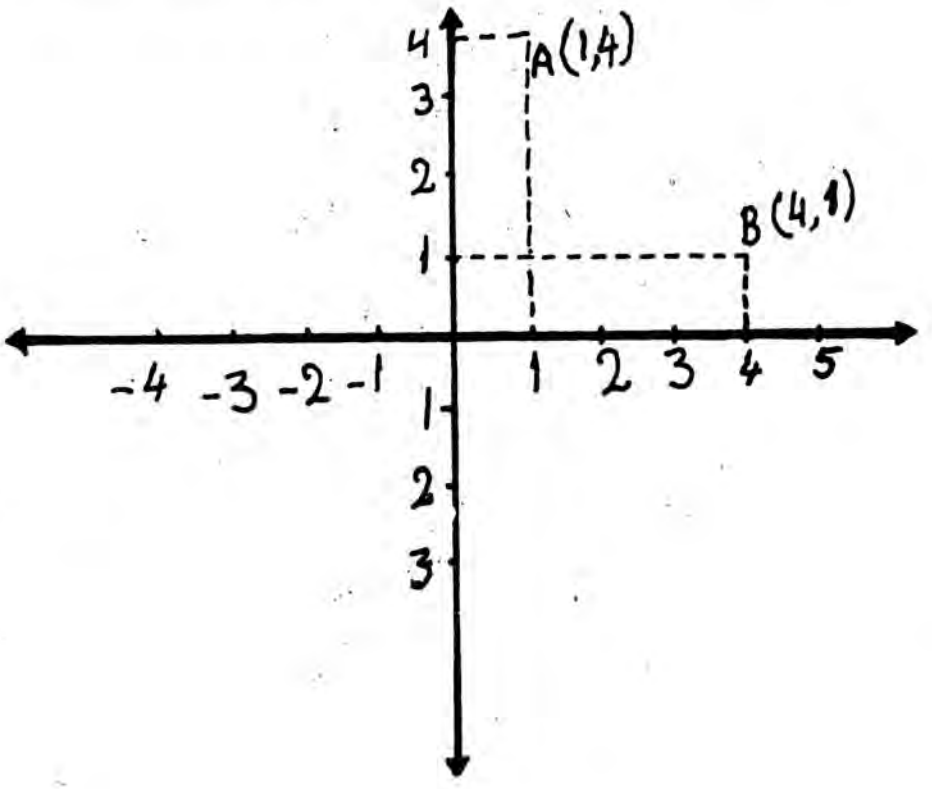
Muuji Barahan A (— 2, — 4), T (1, 3)



Tusaale:

Muuji A (1, 4) , B (4.1)

Halkaa waxa ka cad in (1,4) iyo (4.1) laba barood oo kala jaad ah ay yihiin. Kolkaa, horsanaanta lammaanayaashu macna weyn bay ku fadhidaa.



Layli:

B.

1) Waa maxay faraqa u dhaxeeya xarriiq iyo xarriijin?
2) Maxaa dhidibka x iyo ka y loogu bixiyey dhidibbadii kaartis?
3) Dhidibbada kaartis imisa waaxood bay u qaybiyaan xaashida?
4) Lammaanaha horsan ee bar lagu tilmaamaa sidee buu u horsan yahay3

T.

Barahan soo socda ku muuji dhidibbada Kaartis:

A (5, — 1), B (— 2, — 1), T (0, 5)

J (— 3, 0), X (0, 0)

J.

Magacow waaxyaha barahani ku dhacaan:

1) (2, 4)
2) (— 3, — 3)
3) (— 2, 5)
4) (4, — 2)
5) (0, 0)

X.

Waa maxay kulanka — y ee dhammaan baraha ku yaalla dhidibka — x.

Kh.

Waa maxay kulanka — x ee dhammaan baraha ku yaalla dhidibka — y.

GARAAFKA ISLE'EG TOOSAN

Calaamaddan «=» waa calaamadda isle'ekaanta. Bal laba tibaaxood qor una dhaxaysii summaddan =. Weedhaas baa la yidhaa isle'eg. Ma heshay wax jaadkan ah?

2	+	2	=	5	Isle'eg
dhinac				dhinac	
		summad			

Bal weedhan ka warran? $4 + x = 7$

Miyayna isle'eg ahayn? Way tahay.

Waa maxay faraqa u dhexeeya isle'egtaa iyo tii hore?

Isle'egtaa hore, in ay run tahay iyo in ay been tahay waa la garan karaa, waayo, waxay ka kooban tahay tirooyin. Bal laba u gee saddex, miyaanan helayn shan? Markaa isle'egta hore waa run.

Isle'egta dambe, sida ka muuqata kama wada koobna tirooyin. Waayo? Waxa ku jira hal doorsoome.

Doorsoome waxa la yidhaa xaraf, ama sawir lagu beddeli karo tiradii la doono. Haddaba, $4 + x = 7$ waa isle'eg hase yeeshee, ma garan kartaa run iyo been mid ay tahay? La garan maayo runteeda iyo beenteeda ilaa doorsoomaha x, tiro lagu beddelo.

Bal 3 ku beddel x.

Waxaad heshay isle'egtan

$$4 + 3 = 7$$

Isle'egta aad heshay ma run baa mise waa been? Waa run. Iminka 5 ku beddel x.

Waxaad helaysaa,

$$4 + 5 = 7$$

Ka warran runta iyo beenta isle'egtan? Miyayn tani kula ahayn been? Bal tiradaad doonto ku beddel x; dabadeed, eeg runta iyo beenta isle'egta aad hesho. Maxaa halkaa ka cad? Waxa aad garan doontaa in 3 u yahay tirada qudha ee isle'egta run ka dhigaysa. Tiro kasta oo kale marka lagu beddelo x, waxay ka dhigaysaa isle'egta been.

Bal u fiirso, weedhan:

$$y = x + 1$$

La iskuma hayo inay weedhani isle'eg tahay, laakiin siday uga duwan tahay isle'egtii hore ee ahayd $4 + x = 7$? Isle'egta $4 + x = 7$ waxay qabtaa hal doorsoome sidaynu hore u sheegnay. Laakiin isle'egta ah $y = x + 1$ waxay qabtaa laba doorsoome. Waa kuwee labada doorsoome? Waa x iyo y.

Hore, waxaynu u aragnay sida loo helayo waxa run ka dhiga isle'eg qabta hal doorsoome.

Haddaba sidee loo helayaa waxa run ka dhigaya isle'eg qabta laba doorsoome sida $y = x + 1$.

Sida muuqata waa in tirooyin lagu beddelaa x iyo y. Bal 2 ku beddel x, 3 ku beddel y. Isle'egta kuu soo baxday ma run baa mise waa been?

$$3 = 2 + 1$$

Waa caddaan in ay run tahay isle'egtani. Iminka, 4 ku beddel x, 5 ku beddel y. Kolkaa isle'egtii waa $5 = 4 + 1$ welina waa run. Haddana, 6 ku beddel x, 7 ku beddel y. Isle'egtii waxay noqotay $7 = 6 + 1$ waana run. Ugu dambeys, 8 ku beddel x, 9 ku beddel y. Run ma tahay isle'egta kuu soo baxday? Halkaa maxaa laga garan karaa? Waxaa halkaa ka cad in ay jiraan tirooyin badan oo laba laba u wada socda, runna ka dhiga isle'egyada qaba laba doorsoome. Bal u fiirso isle'egtan

$$y = x - 3$$

Imisa doorsoome bay qabtaa sile'egtani? Laba.

Tirooyinkani run ma ka dhigaan isle'egta?

$$x = 1,\ y = -2$$
$$x = 2,\ y = -1$$
$$x = 3,\ y = 0$$
$$x = -1,\ y = -4$$
$$x = -2,\ y = -5$$

Bal ka warran haddii aynu ku muujinno tusahan.

x	y
+1	-2
2	-1
3	0
-1	-4
-2	-5

Labadii tiro ee kasta ee run ka dhiga isle'eg waxa la yidhaa lammaane.

Lammaanayashan si horsan ma u qori karnaa?

Haa. Tirada lagu beddelayo x hor qor, ta y lagu beddalayana dambaysii. Tirooyinka ku qoran tusaha, marka loo qoro si lamaanayaal horsan ah, waxay noqonayaan:

$(1, -2,)$

$(2, -1)$

$(3, 0)$

$(-1, -4)$

$(-2, -5)$

Layli:

1) Lammaanayaasha horsan ee soo socda run miyay ka dhigaan isle'egta?

$$y = x + 3$$

b) (5, 8)
t) (0, 3)
j) (4, 2)
x) (1, 4)
kh) (— 2, 1)
d) (— 1, 2)
r) (½, 2)
r) (2, 5)
sh) (— 5, — 2)
m) (4, 1)

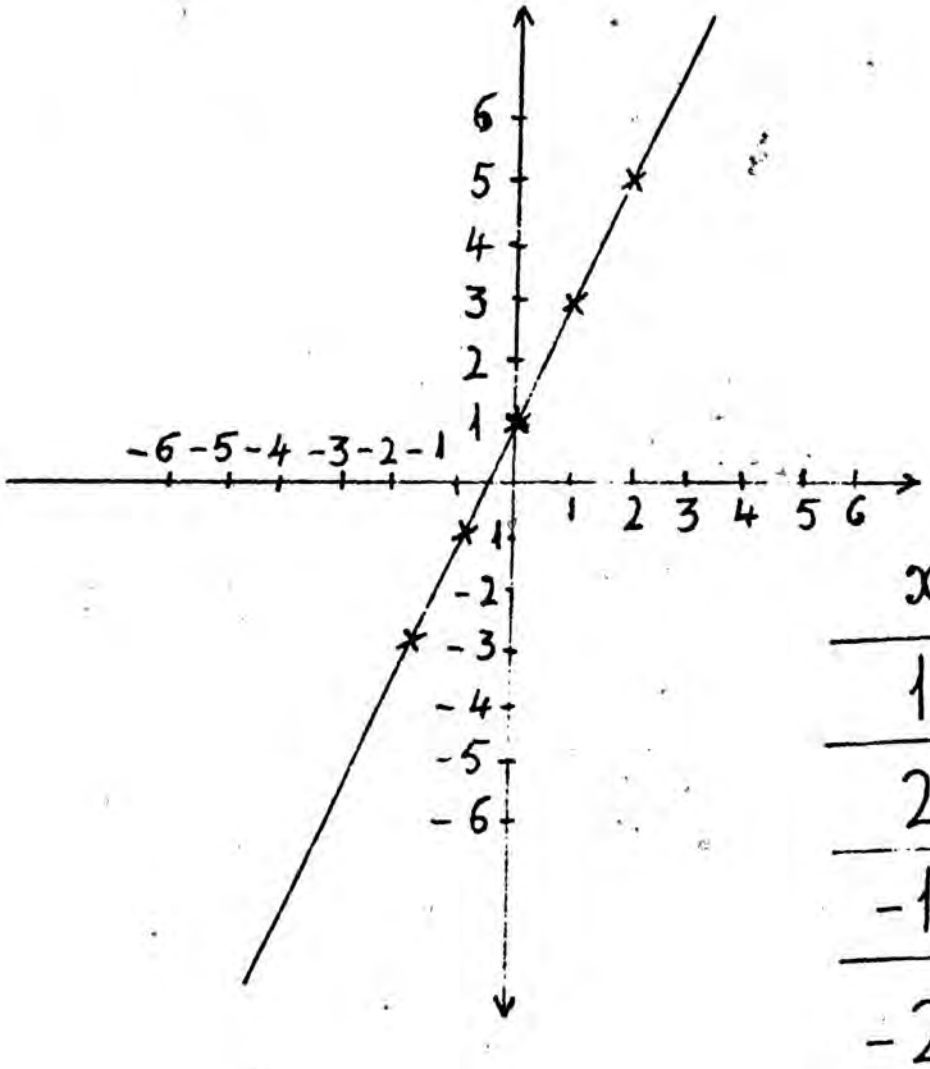
2) Qor toban lammaane oo run ka dhiga isle'egtan.

$$y = 2x - 2$$

Hore waataynu u aragnay sida lammane horsan loogu muujiyo bar sallax Kaartis ku taalla.

Bal aynu isku dayno inaynu sawirno lammaanayaashan horsan ee run ka dhigata isle'egtan.

$$y = 2x + 1$$



x	y
1	3
2	5
-1	-1
-2	-3
0	1

Shanta barood ee aan u taagnay lammaanayaasha horsan ee ku yaalla tusaha mid kasta waxa lagu muujiyey calaamaddan bal isku xidh baraha. Maxaa kuu soo baxay? Xarriiq toosan. Xarriiqda toosan eed heshay baa la yidhaa garaafka isle'egta. Bar kale qaado, oo eeg inay run ka dhigto isle'egta. Halkaa maxaa ka caddaaday? Miyayna dhab kula ahayn in bar kasta oo xarriiqdani ku taalla ay run ka dhigayso isle'egta.

Tusaale:

Sawir garaafka isle'egtan.

$$y = x + 4$$

U fiirso sidan.

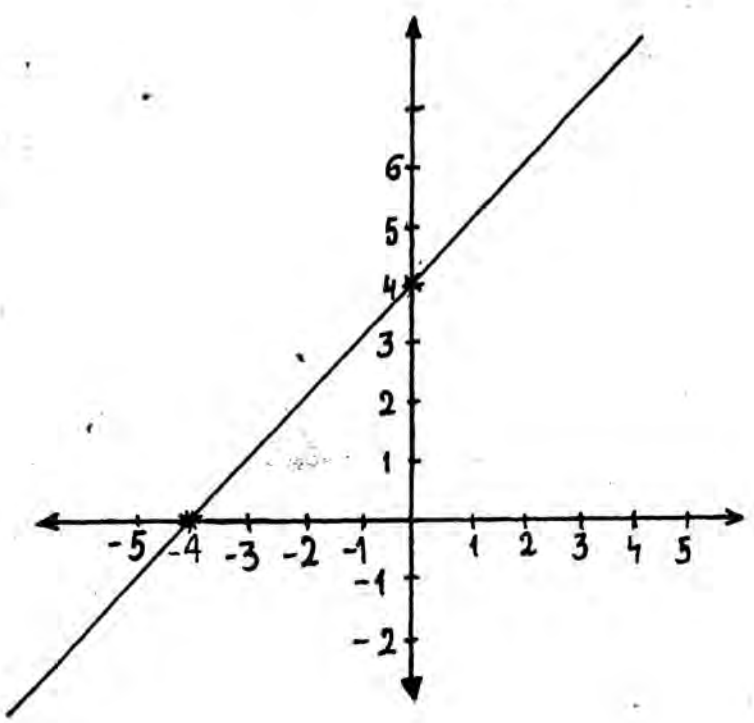
x hadday tahay 2, y waxay noqonaysaa 6.

x hadday tahay + 1, y waxay noqonaysaa 5.

Si aad u fududaysato shaqada tusahan oo kale samayso.

x	y
2	6
1	5
0	4
-1	3
-2	2

Iminka lammaanayaasha horsan ku muuji sallaxa dhidibbada kaartis.



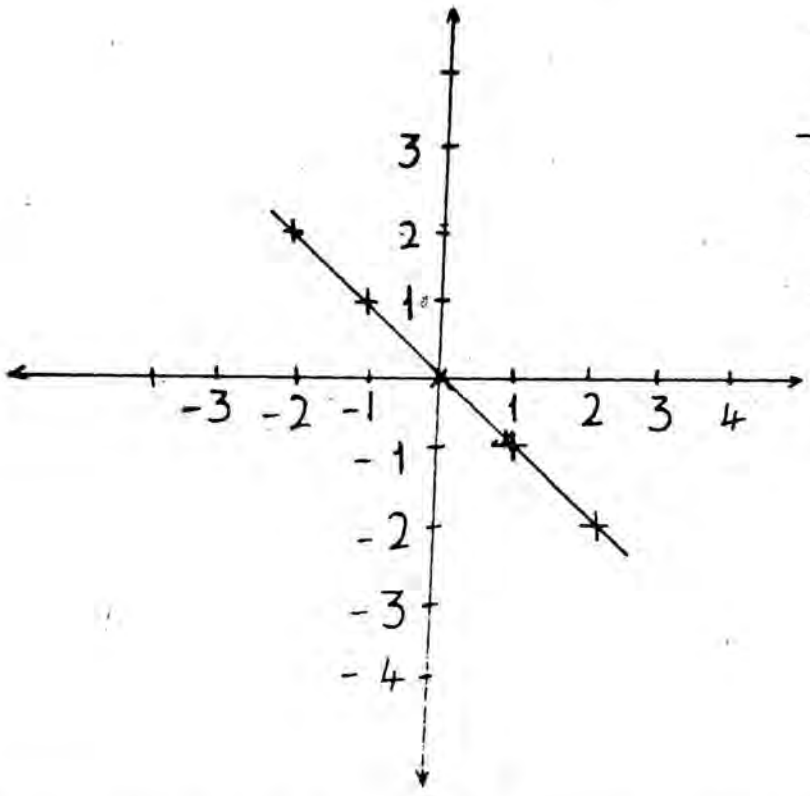
Ugu dambeystii isku xir barada.

Xariiqda toosan ee aad heshay baa la yiraa garaafka isle'egta.

Tusaale:

Muuji garaafka

$$y = -x$$



x	y
+2	-2
1	-1
0	0
-1	1

Inaad aragtay mooyee, tusaalihii hore waxaynu qaadnay shan barood, tusaalahan dambe waxaynu isticmaallay afar barood. Haddaba, su'aasha inoo furani waxa weeye, imisa barood baa loo baahan yahay si loo sawiro garaafka isle'eg toosan? Fududaa jawaabtu!

Bal xaashida ku samee laba barood. Isku xir. Maxaad heshay? Kolkaa, si loo sawiro garaafka isle'eg toosan waxa loo baahan yahay laba barood oo qudha. Hase yeeshee, is looga foojignaado inay baraha mid kaa khaldanto ayaa la isticmaalaa saddex barood. Haddaba iminka iyo wixi ka dambeeya waxaynu qaadan doonnaa saddex barood si loo sawiro garaafka isle'eg toosan.

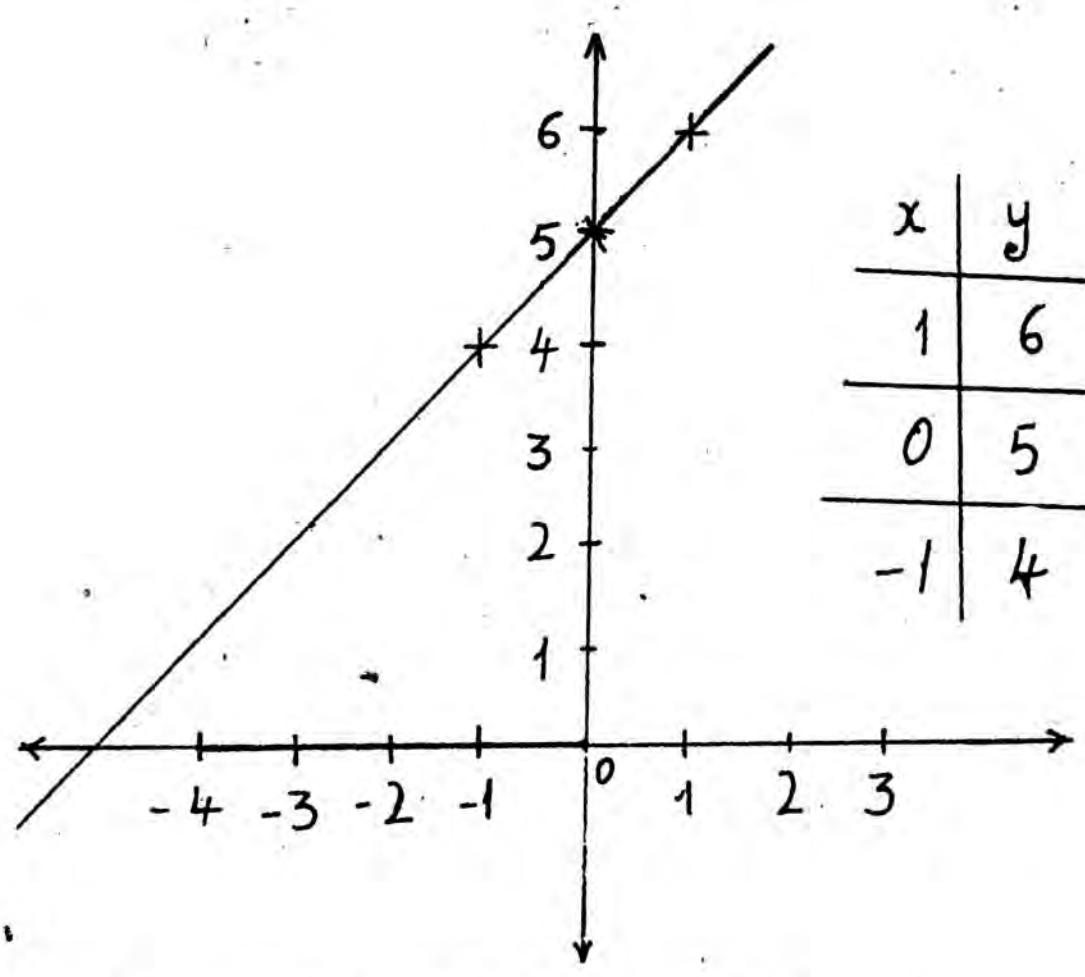
Tusaale:

$$y - x = 5$$

Si ay shaqadu kuugu fududaato, y dhinac u deyso waxa kalena dhinaca kale wada gee,

Kolkaa $y = 5 + x$

ama $y = x + 5$ Waayo?



x	y
1	6
0	5
-1	4

Xarriiqda aan samaynay miyayna ahayn garaafka isle'egta?

Layli:

B. Sawir garaafka isle'egyadan toosan ee soo socda adoo isticmaalaya dhidibbada Kaartis.

1) $y = 5x + 3$
2) $y = 2x + 2$
3) $y = \frac{1}{2} x + 3$
4) $y - x = 4$
5) $x - y = 5$
6) $y = -x + 3$
7) $y = 2$
8) $y = 4$
9) $y = 0$
10) $x = 0$

T. Muuji garaafka isle'egyadan toosan.

1) $\frac{1}{3}(x - y) = 1$
2) $\frac{1}{2} y = x$
3) $\frac{y+x}{2} = \frac{1}{2}$

4) $0 = x - 2y$

5) $2(x - \frac{1}{2}y) = 3$

J.

Maxaa looga jeedaa marka la leeyahay bari waxay run ka dhigtaa isle'eg toosan?

X.

Labada barood baa loo baahan yahay si loo sawiro garaafka isle'eg toosan, laakiin waxaynu isticmaaleyney saddex barood. Waayo?

ISLE'EGYO WADAJIRA OO LEGU FURFURAYO GARAAF

Waxaynu naqaannaa sida loo furfuro isle'eg toosan oo qabta hal doorsoome.

Sida $x + 5 = 3$

$x = 3 - 5$

$\therefore x = -2$

Waxa kaloo naqaanaa isle'eg qabta laba doorsoome inay furfuristeedu tahay dhammaan lammanayaasha horsan ee run ka dhiga isle'egta.

Sida $y = x + 1$

(1, 2), (2, 3), (3, 4), (— 1, 0), (— 2, — 1) (0, 1)

Lammaanayaashani run bay ka dhigaan isle'egta sare. Kolkaa, waxa la odhan karaa waxay ka mid yihiin furfurisyada isle'egtan. Waayo, waxa la heli karaa lammaanayaal kale oo furfuris qudhoodu u noqon kara.

Bal ka warran haddii lagu weydiiyo furfurista laba isle'eg oo wada jira.

$$\begin{cases} y = x + 1 & - (1) \end{cases}$$

Sida

$$\begin{cases} y = 2x + 1 & - (2) \end{cases}$$

(1) Lammaanayaal ka mid ah furfurisyada isle'egta hore sida kor ku qoran waxa weeye:

(1, 2), (2, 3), (0, 1) (— 1, 0) (— 2, — 1) (0, 1)

(2) Lammaanayaal ka mid ah furfurisyada isle'egta dambe waxa weeye:

(1, 3), (2, 5), (3, 7), (— 1, —1), (—2, —3) (0, 1)

Hase yeeshee, furfurista labada isle'eg ee wadajira waa lammaanayaasha run ka dhiga labada isle'egba. Sida kor ka muuqata lammaanaha (0, 1) waa lammaanaha qudha ee labada isle'egba run ka dhiga. Bal ka feker lammaane kale oo labada isle'egba run ka dhiga. Haddaba, sidee baa loo helayaa furfurista isle'egyo wadajira? Siyaala badan baa furfurista isle'egyo wada jira lagu heli karaa. Aljebra ahaan waa lagu heli karaa. hase yeeshee waxaynu isku koobaynaa sida lagu helo furfuristaas inakoo isticmaalayna garaaf. Aan qaadano labadeeni isle'eg ee hore:

$$\begin{cases} y = 2x + 1 & - (2) \end{cases}$$

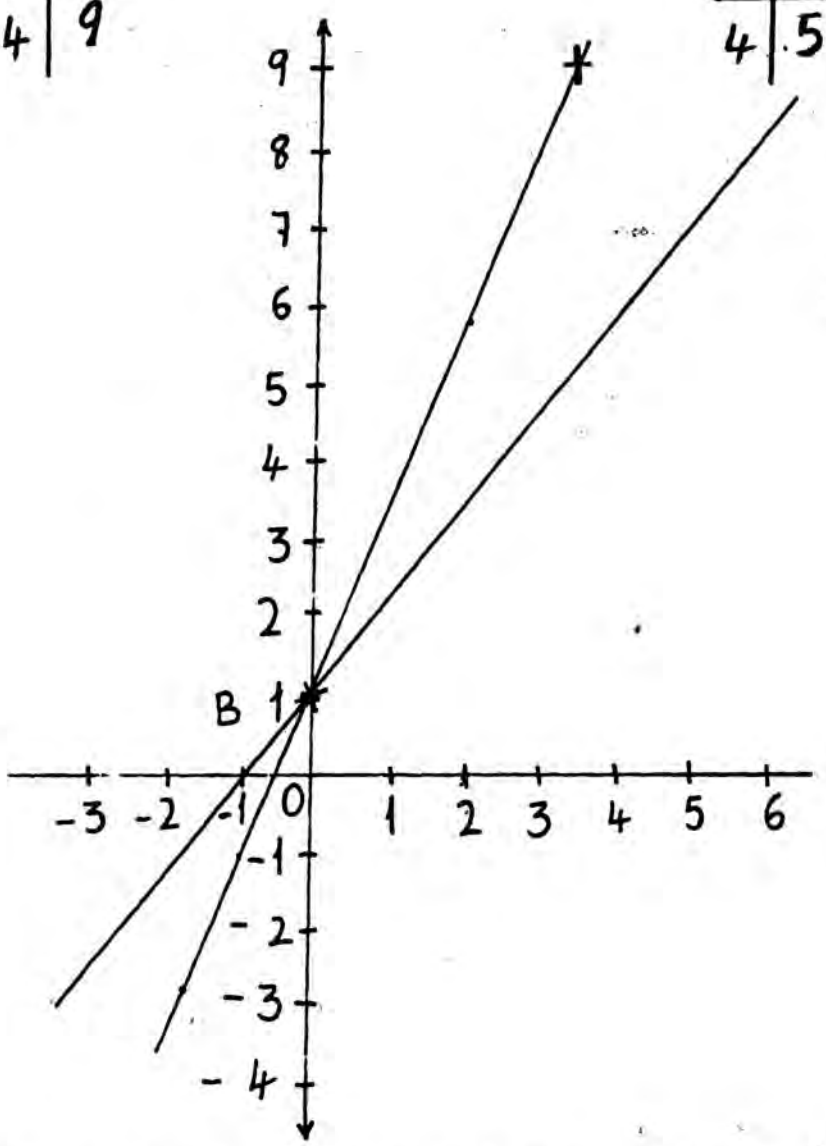
$$\begin{cases} y = x + 1 & - (1) \end{cases}$$

Labada isle'eg mid kasta garaafkeeda sawir, laakiin, labada garaaf ku wada sawir isla dhidibbo.

(2) (1)

x	y
2	5
3	7
4	9

x	y
2	3
3	4
4	5



U fiirso nidaamka lagugu tusay isle'eg kasta xarriiq deeda. Isle'egta hore xarriiqdeedu waa —— (1). Isle'egta dambe xarriiqdeedu waa —— (2).

Bal u fiirso barta B. Bartaasi miyayna ahayn barta labada xarriiq ay iska jaraan? bar kale oo labada xarriiq ku kulmaan ma jirtaa? Runtii barta B waa ta kaliya ee labada xarriiq ku kulmaan. Sidaa daraadeed, barta B waa barta kaliya ee run ka dhigta labada isle'egba. Sidee bay bartan B run uga dhigtaa labada isle'eg? B oo ah (0,1) ku beddel isle'egta hore oo ah:

$$y = x + 1$$

$$1 = 0 + 1$$

$$\therefore 1 = 1$$

Bal isle'egta dambana ku day.

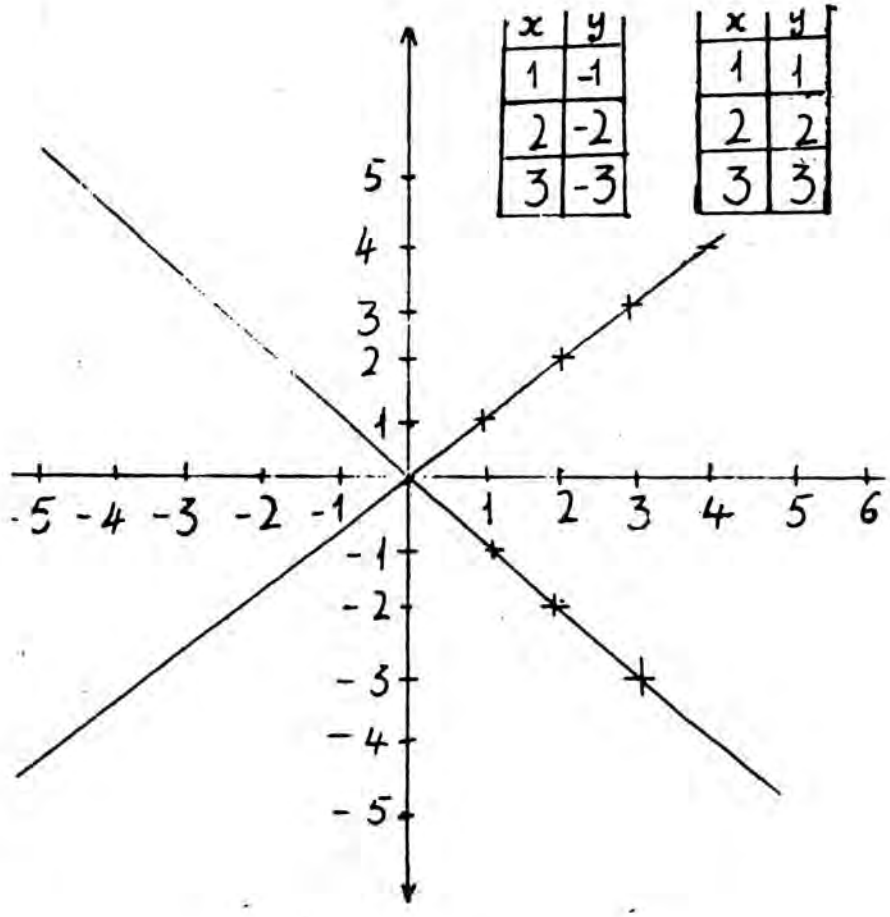
$$y = 2x + 1$$
$$1 = 2.0 + 1$$
$$1 = 0 + 1$$
$$\therefore 1 = 1$$

Kolkaa, bartu labada isle'egba run bay ka dhigtaa. Iminka, bar kale oo labada xarriiq midkood ku taallaa qaado. Bal ku day inay labada isle'egba run ka dhigto. Maxaad halkaa ka gaadhay? In bar kale oo labada isle'egba run ka dhigtaa aysan jirin.

Tusaale:

Garaaf ku furfur isle'egyadan wada jira:

$$\{ y = -x \quad — (1)$$
$$\{ y = x \quad — (2)$$



Iminka furfurista isle'egyada wada jira waa B (0,0).

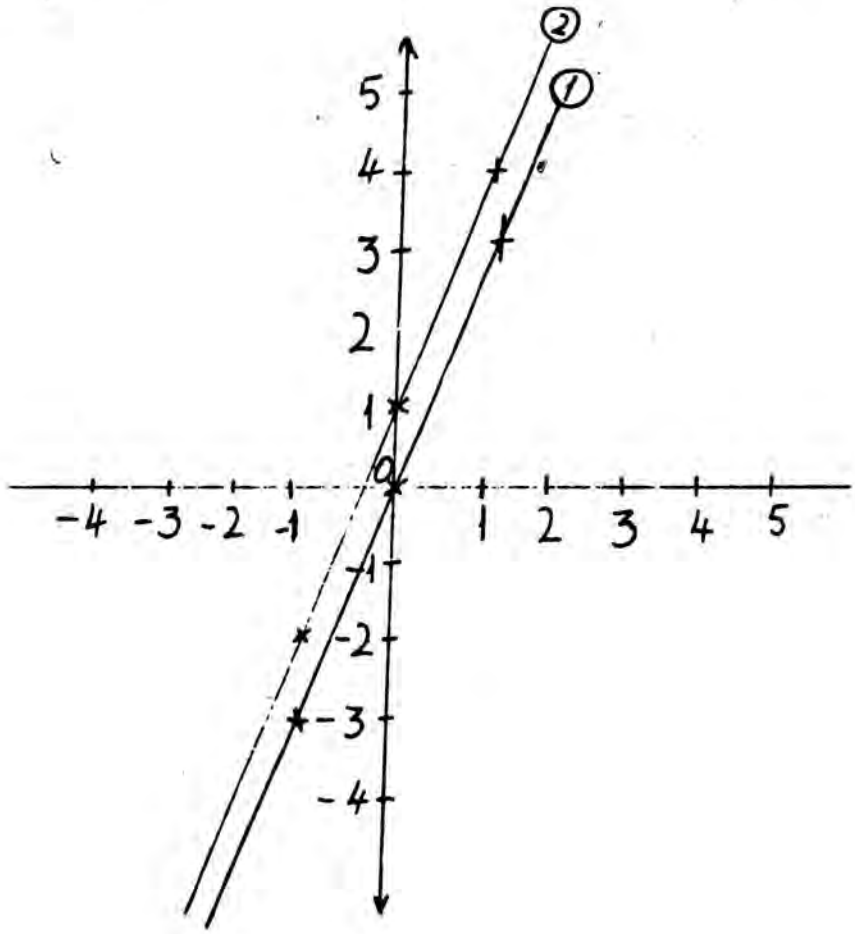
Tusaale:

Furfur isle'egyada wada jira adoo isticmaalaya habka garaafka.

$$\{ y = 3x \quad — (1)$$
$$\{ y = 3x + 1 \quad — (2)$$

x	y
1	3
0	0
-1	-3

x	y
1	4
0	1
-1	-2

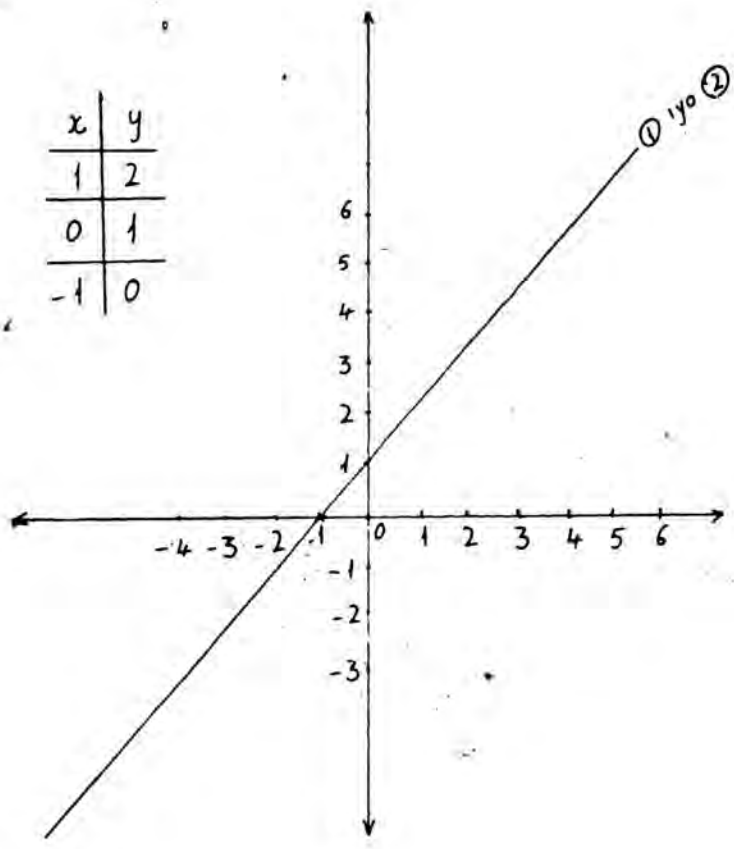


Waa sidee? Bal labada xarriiqba sii jeex. Ma aragtaa inaysan waligood isjarayn? Kolkaa labada xarriiq waa barbarro. Haddaba haddii isle'egyo wada jiraa ku siiyaan xarriiqyo barbarro ah waa maxay furfuristu? Mar haddii aysan jirin bar ay ku kulmaan, ma jirto bar labada isle'egba run ka dhigaysaa. Kolkaa jawaabta su'aashan oo kale waxay noqonaysaa ururka madhan.

Tusaale:

Garaaf ku soo saar furfurista isle'egta wada jira.

$$\begin{cases} y = x + 1 & - (1) \\ 2y = 2x + 2 & - (2) \end{cases}$$



Mee xarriiqdii labaad? Cajiib!

Wax lala yaabo ma aha. Halkii aynu ka filaynay laba xarriiq baa xarriiq kaliyihi inoo soo baxday. Taasi waxay ku tusaysaa labadii xarriiq ee la filayey inay isdulfuuleen ama isa saarmeen. Haddaba waa maxay furfurista labadan isle'eg ee wada jira.

Bal eeg bar kasta oo xarriiq aynu hellay ku taalla inay run ka dhigayso labada isle'egba. Halkaa waxa inooga caddaatay inay bar kasta oo xarriiqda ku taallaa run ka dhigayso labada isle'egba. Sidaa daraaded, bar kastaa way noqon kartaa furfuris. Halkaa waxad ka aragtaa inay furfurisyadoodu aad iyo aad u badan yihiin ooysan xad lahayn.

Nakhtiin

Laba isle'eg oo wada jira garaafkoodu waa:

1) Laba xarriiq oo isjaraya — markaa furfuristu waa bar kaliya.
2) Laba xarriiq oo barbarro ah — markaa furfuristu ma jirto.
3) Laba xarriiq oo isduldhaca — markaa bar kasta waa furfuris.

Layli:

Garaaf ku furfur isle'egyadan wada jira:

1) $y = x - 3$
   $y = -2x$
2) $2x + y = 1$
   $x + 2y = 5$
3) $y = x$
   $y = -x$

4) $y = 3x$

$y = -\frac{1}{2}x + 2$

5) $3x - 4y = 10$

$6x - 8y = 20$

6) $x + 2y = 1$

$y = -\frac{1}{2}x$

7) $y = 5$

$x = 4$

8) $y = 0$

$x = 0$

9) $x = \frac{1}{2}y$

$y = 2x$

10) $2y - x = y$

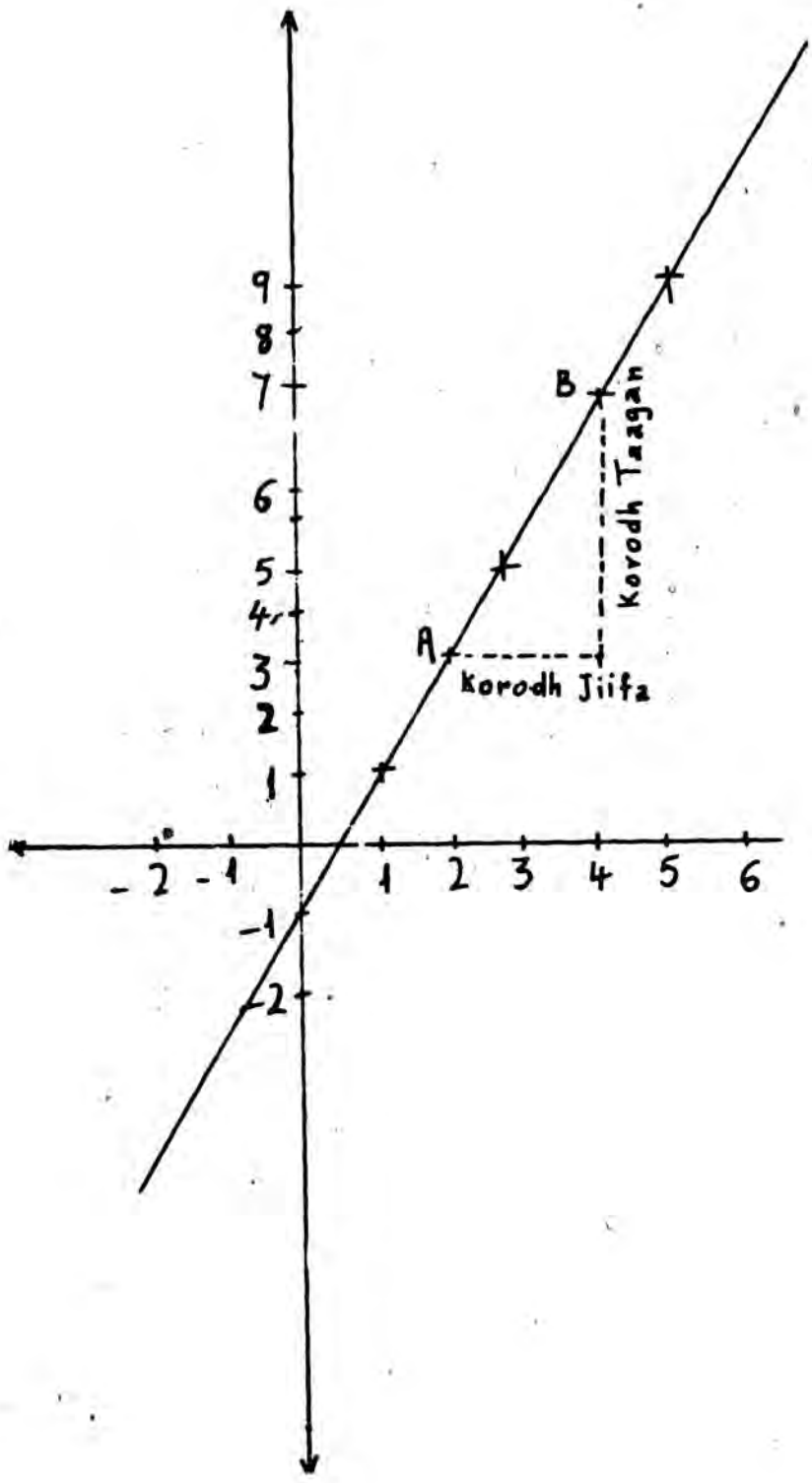
$3x + y = +4x$

TIIRADA XARRIIQ:

Waataynu soo aragnay sida loo sawiro garaafka isle'eg toosan.

Bal aan eegno garaafka $y = 2x - 1$

x	y
1	1
2	3
3	5
4	7
5	9

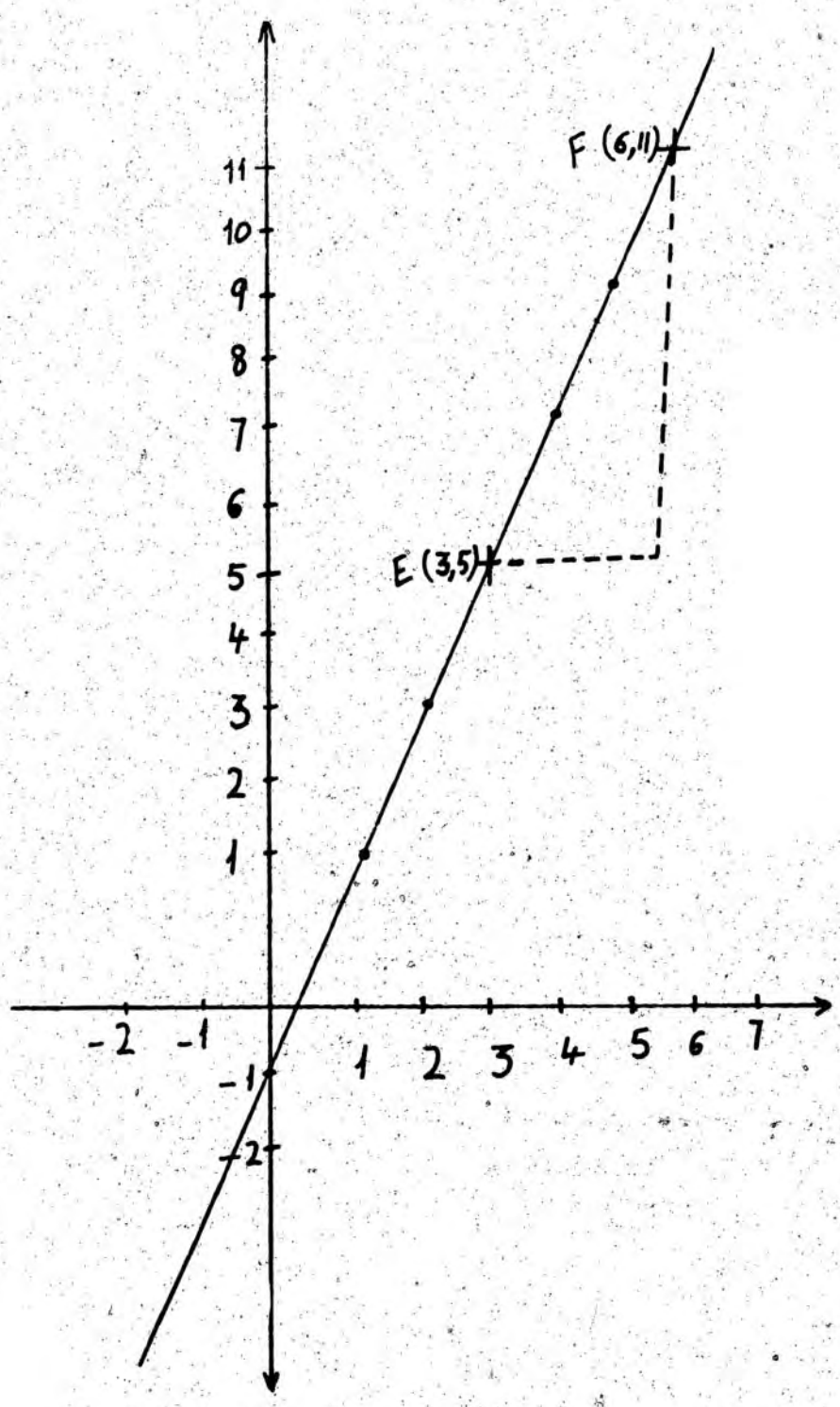


U bixi A barta u taagan (2,3), B ta u taagan (4,7) sida ku muujisan sawirka. Haddaba, A ka tag oo laba nood u soco midigta, halkaa aad joogto afar xubnood kor uga soco. Ma timid B? Labadii xubnood ee aad midigta u socotay waxay ku kordhiyeen kulanka x ee A laba. Afartii xubnood ee aad dabadeed sare u socotayna waxay ku kordhiyeen kulanka y ee A afar.

Haddaba waa maxay saamiga, $\frac{\text{korodh taagan}}{\text{korodh jiifa}}$. Saamigani wuu dhib yar yahay. Korodhka taagan marka la tagayo A (2,3) ee laga tagayo B (4,7) waa $7 - 3 = 4$; korodhka jiifaana waa $4 - 2 = 2$.

Markaa $\frac{\text{korodh taagan}}{\text{korodhka jiifa}} = \frac{4}{2} = 2$

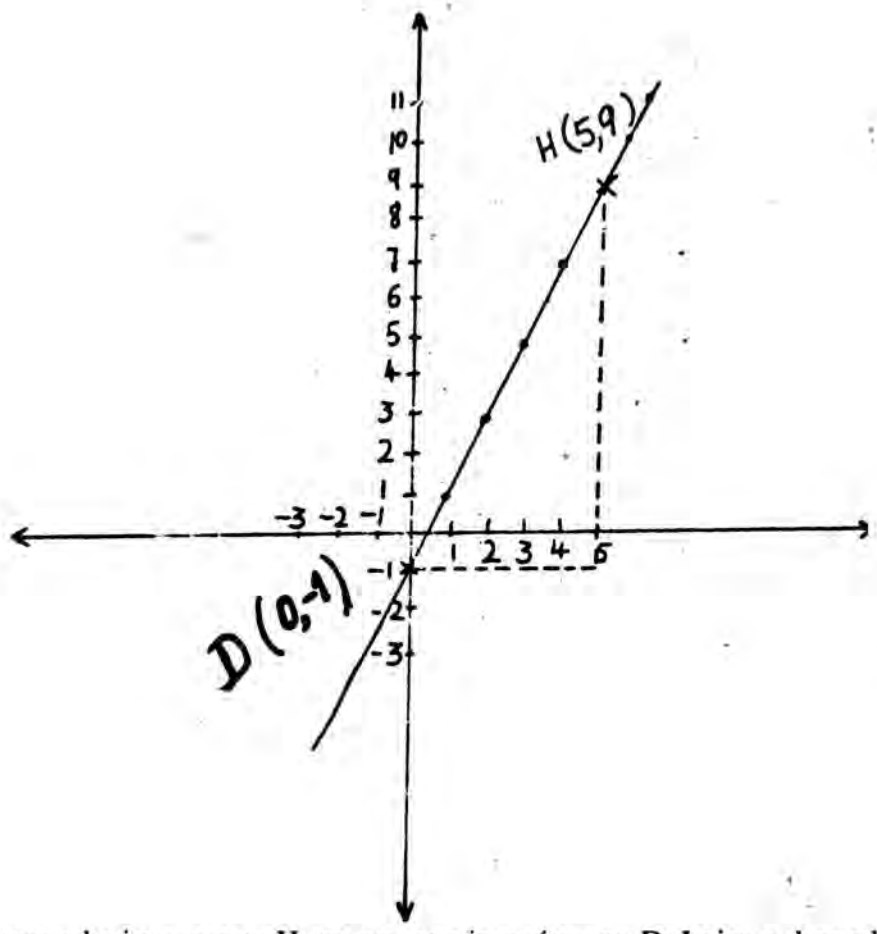
Bal, iminka qaado laba barood oo kale oo ku yaal isla garaafkeennii.....



Ka soo qaad in labadii barood yihiin E (3,5) iyo F (6,11). Haddaba, haddii aad joogto E, oo aad dooneyso inaad tagto, F, imisa xubnood baad midig u soconaysaa? Saddex. Imisa xubnood baad sare u soconaysaa? Lix. Ma aragtaa in korodhka jiifaa uu yahay saddex xubnood, korodhka taaganina uu yahay lix xubnood.

Kolkaa: $\frac{\text{korodh taagan}}{\text{korordh jiifa}} = \frac{6}{3} = 2$

Bal, mar kale aan ku noqonno garaafkennii innagoo qaadanayna laba barood oo kale.



Iminka waxaan ka imanaynaa H, oo waxaan imaańaynaa D. Imisa xubnood baad hoos u soo soconaysaa si aad ula sinaatid D? Toban xubnood oo hoos u socod ah. Mar haddii sare u socodkii ahaa tiro togan waa inuu hoos u socodku noqdaa tiro taban. Marka aad hoos u soo degtid toban xubnood imise xubnood ayaad bidix u soconaysaa si aad u timaádid D? Shan bidix u socod ah. Mar haddii midig u socodkii ahaa tiro togan waa inuu bidix u socodku noqdaa tiro taban.

Kolkaa, $\frac{\text{korodh taagan}}{\text{korodh jiifa}} = \frac{-10}{-5} = 2$

Halkaa maxaa ka cad? Waxaan halkaa ka garan karnaa, haddii labada barood eed doonto aad qaadato, in saamigan yahay mid aan isbeddelin oo jawaab qur ah ku siiya.

$$\frac{\text{korodh taagan}}{\text{korodh jiifa}}$$

Tusaalahaa aan wadnay, mar kasta saamigu wuxuu soo baxay 2.

Haddaba, saamigan $\frac{\text{korodh taagan}}{\text{korodh jiifa}}$

waxa la yidhaahaa tiirada xarriiqda. Tiiradana waxa loo soo gaabiyaa m.

Kolkaa, tiirada xarriiqdu = m = $\frac{\text{korodh taagan}}{\text{korodh jiifa}}$

Haddii aad u fiirsato faallada kor ku qoran, waxaad odhan kartaa, xariiqdii kasta tiiradeedu isma beddesho. Waxaad kalood odhan kartaa qiimaha tiirada waa isku mid adoo labada barood ee aad doonto isticmaalaya.

Haddii aad u fiirsato faalladaan soo wadney, imisa barood baa loo baahan yahay si loo soo saaro tiirada xarriiq? Laba.

Haddaba, marka aad haysato xarriiq, ee lagu yiraahdo soo saar tiiradeeda, waa inaad doorataa laba barood oo ku yaalla xarriiqda. Hase yeeshee waa yara kadeed inaad ka fikirtid imisaa hoos ama sare loo soconayaa iyo imisaa midig ama bidix loo soconayaa. Markaa, sidee baynu hawsha u yaraynaa? In aad aragtay mooyee korodh taagani waa baraha labadood kulan ee Y oo la kala gooyey, korodh jiifaana waa labada kulan ee X oo la kala gooyey. Markaa, miyuuna kula haboneyn jidkaani. Labada barood ka soo qaad A (x_1, y_1) iyo B (x_2, y_2).

$$\text{Tiiro} = m = \frac{\text{korodh taagan}}{\text{korodh jiifa}} = \frac{y_2 - y_1}{x_2 - x_1}$$

Iminka su'aasha inoo furani waa, labada barood sidee baa loo garanayaa ta ah (x_1, y_1) iyo ta ah (x_2, y_2)? Jawaabtu way fududahay, bartaad doonto u bixi (x_1, y_1) markaa barta kalena waxay noqonaysaa (x_2, y_2).

Tusaale:

Waxaad haysataa xarriiq labadan barood ku yaallaan, waxaana lagu weydiiyey tiirada xarriiqda.

A (2,3), B (5,6)

Haddaba baraha midkood u bixi (x_1, y_1) ta kalena ha noqoto (x_2, y_2).

Ka soo qaad A (2,3) in ay tahay (x_1, y_1) markaa B (5,6) waxay noqonaysaa (x_2, y_2).

Kolkaa, $\text{tiiro} = m = \frac{y_2 - y_1}{x_2 - x_1}$

$\therefore m = \frac{6 - 3}{5 - 2} = \frac{3}{3} = 1$

Bal kala beddel oo A (2,3) ka dhig (x_2, y_2)

B (5 , 6) " (x_1, y_1)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Kolkaa, $m = \frac{3 - 6}{2 - 5} = \frac{-3}{-3} = 1$

na aragtay in jawaabtu isku mid tahay, sidaad doonto baraha u magacaw eh.

Digniin:

Iska jir inaad bar.u bixiso (x_1, y_2) ama (x_2, y_1). Waa inaad barta mar kasta u bixisaa (x_1, y_1) ama (x_2, y_2). Waliba jidka tiiradana ma beddeli kartid. Sidiisa u isticmaal.

Tusaale:

Soo saar tiirada xarriiqda marta baraha soo socda.

A (5, 3), B (10, 8), C (12, 10)

Furfuris:

Markaaba waa inaad isweydiiso imisa barood baa loo baahan yahay si loo soo saaro tiirada. Laba qur ah. Haddaba saddexda barood uma wada baahnide, laba uun ka qaado. Ka dhig inaad qaadatay A (5,3) iyo C (12,10); midkood u bixi (x_1, y_1) ta kalena ha noqoto (x_2, y_2).

A (5, 3) ——— (x_1, y_1)

C (12, 10) ——— (x_2, y_2)

Kolkaa,

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{10-3}{12-5} = \frac{7}{7} = 1$$

Bal C (12, 10,) ka dhig (x_1, y_1)

A (5,3) ka dhig (x_2, y_2)

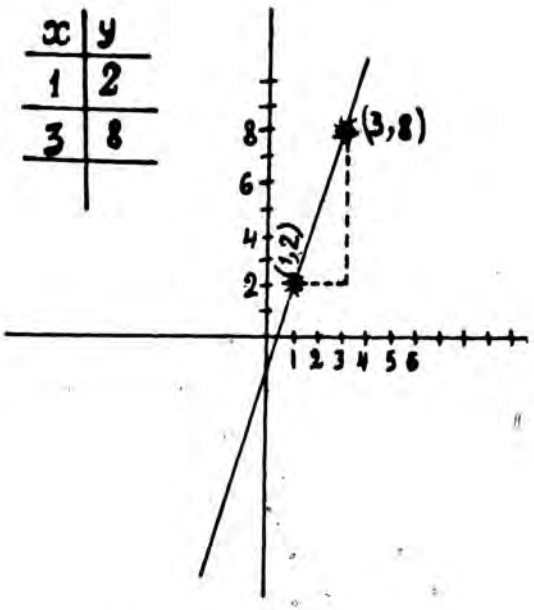
tiirada ma kuu soo baxday I?

Tusaale:

Waxa lagu siiyey isle'egta $y = 3x - 2$ waxana lagu weydiiyey tiirada xarriiqda isle'egta.

Furfuris:

Sawir garaafka $y = 3x - 1$



Haddaba, labadaa barood isticmaal si aad u hesho tiirada xarriiqda.

(1, 2) ka dhig (x_1, y_1)

(3, 8) " (x_2, y_2)

Kolkaa, $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{8-2}{3-1} = \frac{6}{2} = 3$

Tusaale:

Waa maxay tiirada isle'egtani,

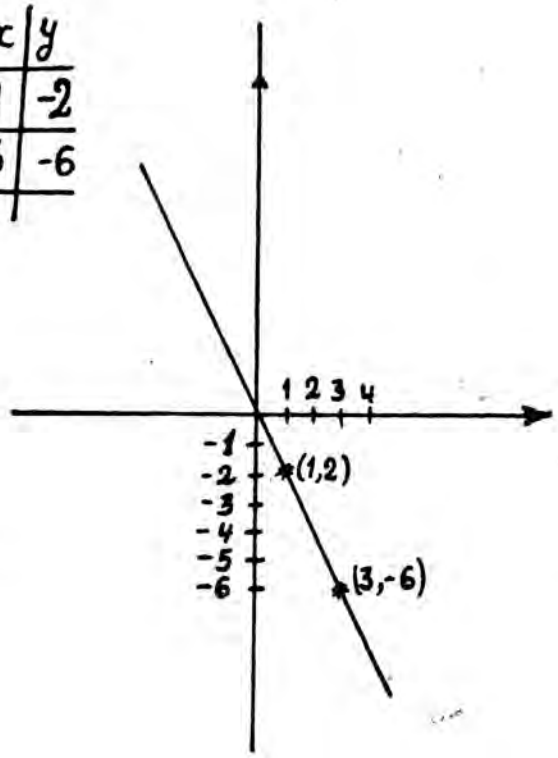
$$y = -2x$$

Furfuris:

Sawir garaafka,

$$y = -2x$$

x	y
1	-2
3	-6



(1, —2) ka dhig (x_1, y_1)

(3, —6) " (x_2, y_2)

Kolkaa,

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(-6) - (-2)}{3 - 1} = \frac{-6+2}{2} = \frac{-4}{2} = -2$$

Tusaalahani wuxuu caddeynayaa in xarriiqyada qaarkood leeyihiin tiiro ah tiro taban.

Layli:

1) Imisa barood baa loo baahan yahay si aad u hesho tiirada xarriiqda?

2) Waa maxay jidka lagu soo saaro tiirada xariiq?

3) Labada barood ee loo baahan yahay marka la soo saarayo tiirada xarriiq, ma tii la doonaa loo bixinayaa (x_1, y_1)?

4) Soo saar tiirada xarriiqyada mara barahani:

   b) (0, 0) (2, 2)

t) (0, 0), (2, 3)

j) (1, 2) (2, 3), (5, 6)

x) (3, —3), (4, —4)

5) Sawir garaafka isle'eg kasta oo soo socota. Garaaf kastana laba barood ka dooro oo soo saar tiirada xarriiqdaas.

b) $y = 2x + 3$

t) $2y = x$

j) $y = 5x - 5$

x) $y = 2$

kh) $x = 2$

TIIRADA XARRIIQDA SIDA LOOGA SOO SAARO ISLE'EGTA XARRIIQ

Waataynu soo aragnay marka la raadinayo tiirada xarriiq in loo baahan yahay laba barood, dabadeed lagu shaqeeyo jidka. Su'aasha iminka aynu isweydiinynaa waxa weeye haddii isle'eg aad haysato, markaaba ma garan kartaa tiirada xarriiqda isle'egtaa. Isle'eg kasta oo toosan wuxuu garaafkeedu noqonayaa xarriiq toosan sidii hore aynu u sheegnay.

Haddaba, waa maxay tiirada $y = 2x + 1$

Kolkaa, (1, 3) ka dhig (x_1, y_1)

(2, 5) " (x_2, y_2)

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\therefore \frac{5 - 3}{2 - 1} = \frac{2}{1} = 2$$

Bal u fiirso weheliyaha x ee isle'egta.

Miyuuna laba ahayn.

Tusaale:

$$y = -x + 1$$

x	y
2	-1
3	-2

(2, — 1) ka dhig (x_1, y_1)

(3, — 2) " (x_2, y_2)

Kolkaa, $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(-2) - (-1)}{3 - 2}$

$$= \frac{-2 + 1}{1} = \frac{-1}{1} = -1$$

Waa maxay weheliyaha x ee isle'egtu? Waa — 1. Halkaa maxaa ka cad? Waxa ka cad xeerkan haddii isle'eg toosan loo qoro sansaanta $y = mx + b$, weheliyaha x oo ah m waa tiirada xarriiqda.

Tusaale:

Waa maxay tiirada

$$y = 3x + 5$$

Ma tahay isle'egtani sansaanta $y = mx + b$?

Bal is garab dhig:

$$y = 3\ x + 5$$
$$\downarrow \quad \downarrow\downarrow \quad \downarrow$$
$$y = m\ x + b$$

Maxaa ku beegan m?

Haddaba $m = 3$

Tusaale:

$$y = -4\ x + 4$$

Bal garab dhig sansaantii

$$y = -4\ x + 4$$
$$\downarrow \quad \downarrow\downarrow \quad \downarrow$$
$$y = m\ x \quad b$$

Kolkaa $m = -4$

Tusaale:

$$3y = 12x + 4$$

Isle'egtani uma qorna sansaantii $y = mx + b$ waayo waa inaad dhinac y kaligeed ku haysataa. Hase yeeshee, si aan y keligeed dhinac ugu haysano, waa in labada dhinacba loo qaybiyaa 3.

$$\frac{3y}{3} = \frac{12x + 4}{3}$$
$$\therefore y = 4x + 4/3$$

Haa, iminka ayay sansaantii u qoran tahay.

Haddaba $y = 4\ x + 4/3$

$$\downarrow \quad \downarrow \quad \downarrow$$
$$y = m\ x + b$$

Kolkaa, $m = 4$

Waxaynu gaadhnay haddii isle'eg loo qoro sansaanta $y = mx+b$, in weheliyaha x yahay tiirada. Haddaba b maxay tahay?

Tusaale:

$$y = 2x + 1$$

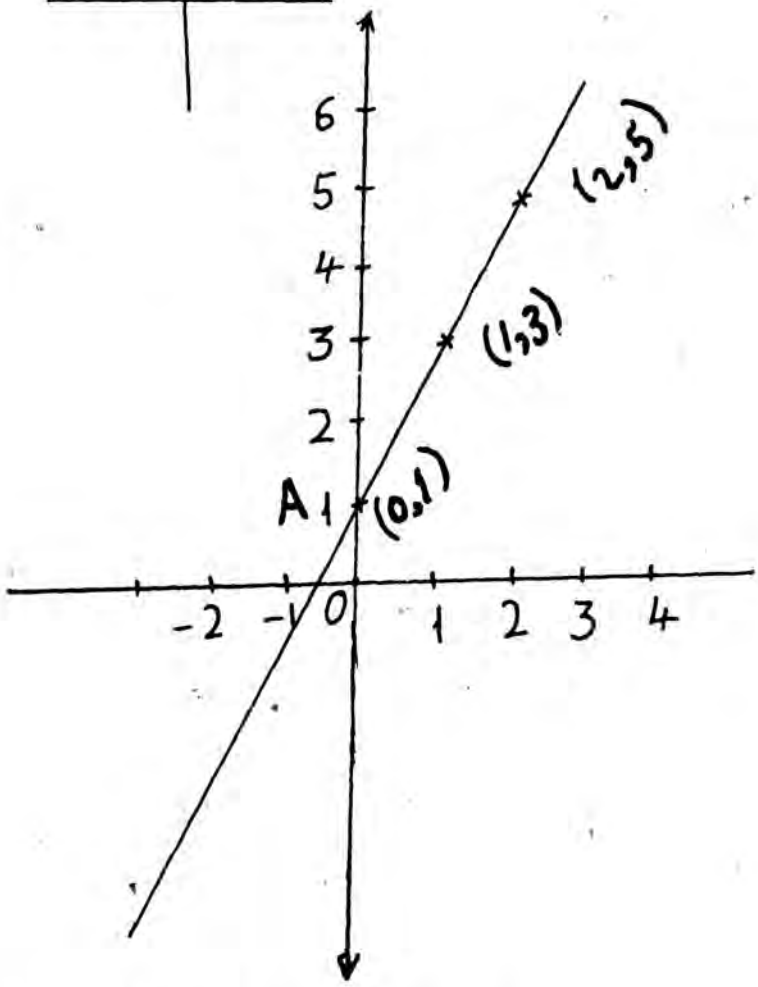
maxay noqonaysaa b?

$$y = 2x + 1$$
$$\downarrow\ \downarrow\ \ \downarrow$$
$$y = 2x + b$$

Kolkaa b = 1

Bal isle'egtaa sawir garaafkeeda:

x	y
1	3
2	5



Waa maxay barta xarriiqdu ay ka jarto dhidibka y?

Bartaasi waa A (0,1), kolkaa kulanka y ee barta A waa 1, kor maxaynu nidhi b way le'eg tahay?

Haddaba, haddii isle'eg loo qoro sansaanta $y = mx + b$ weheliyaha x waa tiiradii, b waa kulanka y ee barta ay xarriiqdu ka jarto dhidibka y, waxana la yiraahaa waa tikraar.

Tusaale:

Waa maxay tiirada iyo tikraarka y ee isle'egtani;

$$y = -3x + 7$$
$$\downarrow \quad \downarrow\downarrow \quad \downarrow$$
$$y = mx + b$$

Kolkaa $m = -3$

$b = 7$

Sidee baa loo caddayn karaa in tikraarka y uu yahay 7? Tikrarka y waa kulanka y ee barta y xarriiqdu ka jarto dhidibka y. Kolkaa bartaa kulankeeda x waa 0, markaa kulanka y muxuu noqonayaa?

Kolkaa:

$$y = -3(0) + 7$$
$$y = 0 + 7$$
$$y = 7$$

Waxaad aragtaa in kulankii y noqday 7.

Tusaale:

$$y = 2x$$
$$\downarrow \quad \downarrow$$
$$y = mx + b$$

Mar haddii tibixda 2x wax ka dambeeyaa aanu jirin, $b = 0$.

Tusaale:

$$y = 3x - 4$$
$$\downarrow \quad \downarrow\downarrow \quad \downarrow$$
$$y = mx + b$$

Kolkaa $b = -4$

Layli:

B) Waa maxay tiirada iyo tikraarka y ee isle'egyadan soo socda?

1) $y = 100x + 3$
2) $y = 20x - 3$
3) $y = \frac{2}{3}x + 5$
4) $2y = 3x + 4$
5) $3y = 12x$
6) $y = -4x - 4$
7) $3y - 2x = 0$
8) $y + 3 = 2x$
9) $y = 4$
10) $y = -5$

T) Sawir garaafka isle'eg kasta. Garaaf kasta ka soo saar tikraarka y. Hubi in tikraarka y sax yahay adoo isle'egta garab dhigaya sansaanta $y = mx + b$.

1) $y = 2x - 3$
2) $2y + 3x - 6 = 0$
3) $3x - y = 3$
4) $2y = 3x$
5) $3x - 3 = 0$

XARRIIQ ISLE'EGTEED

Waxaynu hore u gaadhnay in xarriiq kasta oo toosani leedahay isle'eg toosan. Xarriiq toosanna waynu sawiri karnaa.

Waliba waxaynu soo aragnay in isle'eg kasta oo toosan loo qori karo sansaanta $y = mx + b$, m waa tiirada, b waa tikraarka y. Kolkaa haddii tiirada iyo tikraarka y aad haysato miyaanad isle'egta soo saari karin?

Tusaale:

Waa maxay isle'egta toosani ee xarriiq tiiradeedu tahay 3, tikraarka y yahay 5.

Furfuris:

Isle'eg kasta oo toosan waxa loo qori karaa sansaantan:

$$y = mx + b$$

Kolkaa, $y = 3x + 5$

Tusaale:

Soo saar isle'egta xarriiqda marta barta (2,3), tiiradeeduna tahay 4.

Furfuris:

Isle'egtan waxa loo qori karaa sansaanta

$$y = mx + b \text{ Kolkaa}$$

Tiirada waan haysannaaye, sidee baa loo helaa tikraarka?
Bal horta 4 ku beddel m.
Kolkaa, $y = 4x + b$
Haddaba, mar haddii la ina siiyey bar ku taalla xarriiqda, waa in bartaasi ay run ka dhigtaa isle'egtan:

Kolkaa
$$y = 4x + b$$
$$(3) = (4 \times 2) + b$$
$$3 = 8 + b$$
$$3 - 8 = b$$
$$-5 = b$$

Kolkaa waxan ka soo saarnay b.
Markaa, isle'egtii xarriiqdu waxay noqonaysaa:

$$y = 4x + (-5)$$
$$y = 4x - 5$$

Tusaale:

Soo saar isle'egta marta labadan barood:

(2,6) iyo (1,4)

Furfuris:

Isle'egta la doonayo waxa loo qori karaa $y = mx + b$

Hase yeeshee, tiirada iyo tikraarka y midna ma haysanno. Markaa, waa in aynu raadinaa si aynu u helno m iyo b. Ma xasuusan tahay haddii laba barood oo ku yaalla xarriiq aad haysato in la soo saari karo tiirada xarriiqdaas?

(2,6) ka dhig (x_1, y_1)
(1, 4) » (x_2, y_2)

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 6}{1 - 2} = \frac{-2}{-1} = 2$$

Iminka tiiradii waynu hellay. Bal qiimaha m ku beddel sansaantii guud ee isle'egta.

$$y = mx + b$$
$$y = 2x + b$$

Weli waxa inoo dhiman sidaynu u heli lahayn qiimaha b. Sidii su'aasha hore labada barood midkood qaado oo ku beddel isle'egta. Maxaan kulannada bartaa ugu beddelaynaa isle'egta?

Bal isticmaal (2, 6)

$$y = 2x + b$$
$$6 = (2x2) + b$$
$$6 = 4 + b$$
$$6 - 4 = b$$
$$2 = b$$

Kolkaa, isle'egtii waa $y = 2x + 2$

Bal hadda isticmaal barta kale ee ah (1, 4). Isle'egta aad heshay ma la mid tahay tii sare?

Layli:

(B) Soo saar isle'egta xarriiq kasta. Waxaana lagu siiyey tiirada xarriiqda iyo bar ku taalla xarriiqda:

(1) $m = 1$ (3,5)

(2) $m = -1$ (0,0)

(3) $m = 2/3$ (1,4)

(4) $m = 0$ (0,5)

(5) $m = 2/1$ (3,2)

T) Soo saar isle'egta xarriiq kasta oo marta barta lagu siiyey.

1) (5,6) iyo (3, 3)

2) (—4, 1) iyo (3, —8)

3) (—2, —2) iyo (0,0)

4) (—5, —3) iyo (—2, —7)

5) (0,0) iyo (4, 0)

J) Sidee baad u caddayn in tikraarka y ee isle'egtani yahay —2.

$$y = 3x - 2$$

CUTUBKA IV

QORMO SAYNIS IYO LOGARDAMKA CAADIGA AH

Culimada Saynisku waxay isticmaalaan qormada sayniska si ay u qori karaan tirooyinka aad u waa weyn iyo kuwa aad u yar yar sida xawaaraha ilaysku uu hawada ku maro oo ah 29,900,000,000 sentimitir sakankiiba, ama cufka borotoonka oo ah 0.000,000,000,000,000,000,000,001,65 oo garaam. Haddii tirooyinkaa loo qoro sida caadiga ah, meel weyn bay qaadanayaan akhrigooduna wuu adkaanayaa. Markaa waxa wanaagsan in la isticmaalo qormada sayniska. Tirada hore oo ah 29,900,000,000 waxay noqonaysaa 2.99×10^{10}, ta dambe oo ah 0.000,000,000,000,000,000,000,001,65 waxay noqonaysaa 1.65×10^{-24}.

Tirada qormo saynis ku qoran waxay ka kooban tahay tiro ka weyn ama le'eg kow, kana yar toban oo lagu dhuftay toban abyoone ku jibbaaran. Waxa kale oo aan odhan karnaa, tirada u qoran qormo saynis wáa tiro leh hal god oo aan eber ahayn oo bidix ka xiga barta jajab tobanlaha, waxayna ku dhufsan tahay toban ku jibbaaran abyoone togan ama abyoone taban.

Tusaale ahaan, haddii aan rabno in aan u qorno xawaaraha ilayska oo ah 29,900,000,000, habka qormada sayniska waxaan u raraynaa barta jajab tobanlaha sagaalka iyo labada dhexdooda, waxaynu ku dhufanaynaana toban ku jibbaaran toban. Markaa wuxuu noqonayaa 2.99×10^{10}. U fiirso in 2.99 ay tahay tiro toban ka yar, kowna ka weyn, ama ay tahay tiro god keliyihi bidix ka xigo barta jajab tobanlaha, tobanlaha ku jibbaaran tobanku waa inta god ee barta jajab tobanlaha loo raray xagga bidix.

Cufka Borotonka oo ah 0.000,000,000,000,000,000,000,001,65 marka loo qoro qormo saynis wuxu noqonayaa 1.65×10^{-24}. U fiirso in 1.65 ay tahay tiro ka yar toban kana weyn hal, ama tiro god qudhihii bidixda ka xigo barta jajab tobanlaha. Afarta iyo labaatanka (—24) waxay tilmaamaysaa inta god ee barta jajab tobanlaha midig loo raray. Haddii barta jajab tobanlaha loo raro bidix, jibbaarka tobanku wuxuu noqonayaa abyoone togan, haddii midig loo rarana jibbaarka tobanku wuxuu noqonayaa abyoone taban.

Tusaale ahaan, haddii aan rabno in aan qorno tirada 3713.427 habka qormada sayniska waxay noqonaysaa 3.713427×10^{3}. Haddii aad eegtid 3.713427 waa tiro ka weyn hal kana yar toban ama god qudhihi bidix ka xigo barta jajab tobanlaha. Seddexda tobanka ku jabbaarani waxay sheegeysaa inta god ee barta bidix loo raray.

Haddii aan xeerarkii jajab tobanlaha dib ugu noqonno, waxan arkaynaa in 3713.427 ay la mid tahay 3.71347×1000. 1000 waxay la mid tahay $10 \times 10 \times 10$ ama 10^{3}.

Tusaale kale, haddii la rabo in 0.0002701 loo qoro habka qormo saynis waxay noqonaysaa 2.701×10^{-4}. 2.701 waa tiro god qudhihi barta jajab tobanlaha bidix ka xigo, afarta taban (—4) ee tobanka ku jibbaarani waxay tilmaamaysaa inta god ee barta midig loo raray.

Haddii aan u fiirsano xidhiidhka ka dhexeeya jajab tobanlaha, jibbaarrada iyo qormada sayniska, waxan arkaynaa in 0.0002701 ay la mid tahay $\frac{2.701}{10000}$ ama $2.701 \times \frac{1}{10000}$. Isla markaa $\frac{1}{10000}$ waxay la mid tahay $1 \times \frac{1}{10^{4}}$ ama $\frac{1}{10^{4}}$ waxay la mid tahay 10^{-4}, waayo qeexda tirada ku jibbaaran tiro taban ayaa ahayd sida hoos ku qoran:

$$a^{-n} = \frac{1}{a^{n}}$$, haddii a iyo n ay yihiin abyoonayaal togan.

Markaa haddii qeexda aan raacno, 10^{-4} waxay la mid tahay $\frac{1}{10^{4}}$.

Nakhtiin ahaan, $0.0002701 = \frac{2.701}{10000} = 2.701 \times \frac{1}{10000} =$

$= 2.701 \times \frac{1}{10^4} = 2.701 \times 10^{-4}$

ama $0.0002701 = 2.701 \times 10^{-4}$

Sida aad u fahantid sida loogu beddelo tiro u qoran sansaanta jajab tabanle. tiro u qoran qormo saynis, u fiirso tusaalaha hoos ku yaal. Dhugo sida jibbaarka tobanku uu isku beddelayo.

Nakhtiin ahaan, $0.0002701 = \frac{2.701}{10000} = 2.701 \times \frac{1}{10000} =$

$= 2.701 \times \frac{1}{10^4} = 2.701 \times 10^{-4}$

ama $0.0002701 = 2.701 \times 10^{-4}$

Sida aad u fahantid sida loogu beddelo tiro u qoran sansaanta jajab tabanle. tiro u qoran qormo saynis, u fiirso tusaalaha hoos ku yaal. Dhugo sida jibbaarka tobanku uu isku beddelayo.

$0.0000534 = 5.34 \times \frac{1}{100000} = 5.34 \times \frac{1}{10^5} = 5.34 \times 10^{-5}$

$0.000534 = 5.34 \times \frac{1}{10000} = 5.34 \times \frac{1}{10^4} = 5.34 \times 10^{-4}$

$0.00534 = 5.34 \times \frac{1}{1000} = 5.34 \times \frac{1}{10^3} = 5.34 \times 10^{-3}$

$0.0534 = 5.34 \times \frac{1}{100} = 5.34 \times \frac{1}{10^2} = 5.34 \times 10^{-2}$

$0.534 = 5.34 \times \frac{1}{10} = 5.34 \times \frac{1}{10^1} = 5.34 \times 10^{-1}$

$5.34 = 5.34 \times \frac{1}{10^0} = 5.34 \times \frac{1}{10^0} = 5.34 \times 10^0$

$53.4 = 5.34 \times 10 = 5.34 \times 10^1 = 5.34 \times 10^1$

$534. = 5.34 \times 100 = 5.34 \times 10^2 = 5.34 \times 10^2$

$5340. = 5.34 \times 1000 = 5.34 \times 10^3 = 5.34 \times 10^3$

$53400. = 5.34 \times 10000 = 5.34 \times 10^4 = 5.34 \times 10^4$

$534000. = 5.34 \times 100000 = 5.34 \times 10^5 = 5.34 \times 10^5$

Tusaha kor ku yaal wuxuu muujinayaa sida tiro u qoran sansaanta jajab tobanle loogu beddeli lahaa tiro u qoran qormo saynis. Tusaala ahaan, u fiirso:

0.0534 iyo 5.34×10^{-2}

waa isla tiradii oo u qoran qormo saynis.

Tusaalooyinka hoos ku shaqaysani waxay muujiyaan sidii tiro u qoran sansaan tobanle loogu beddeli lahaa tiro u qoran qormo saynis.

Tusaale 1.

Fogaanta ay qorraxda iyo dhulka isu jiraan waa 93,000,000 mayl. U qor tiradaa qormo saynis.

Furfuris: 93,000,000 mayl = 9.3×10^7 mayl

Ogsoonow in 9.3 ay tahay tiro leh god qudha, oo bidix ka xiga barta jajab tobanle, toddobada ku jibbaaran toban kuna sheegayso inta god ee barta loo raray bidix.

Tusaale 2.

(Tirada Afogaadaro) 602,000,000,000,000,000,000,000 oo malakuyuul baa ku jirta 22.4 litir oo gaas ah. U qor tiradaa qormo saynis.

Furfuris:

602,000,000,000,000,000,000,000, = 6.02×10^{23}

Tusaale 3.

Cufka Borortoonka ogsijiintu waa 0.000,000,000,000,000,053 maykarogaraam. U qor qormo saynis.

Furfuris:

0.000,000,000,000,000,053 = 5.3×10^{-17} u fiirso in — 17 ay sheegayso inta god ee barta jajab tobanlaha loo raray xagga midig.

Tusaale 4.

U qor 3.83×10^{-3} sansaanta jajab tobanle.

Furfuris:

3.83×10^{-3} = .00383

Haddii lagu siiyo tiro u qoran qormo saynis, oo lagu yidhaahdo qor tiradaa adoon isticmaalayn jibbaar, ama lagu yidhaahdo ka dhig tiro u qoran sansaanta jajab tobanle waxaad samaynaysaa sidan soo socota.

b) Haddii jibbaarka tobanku uu abyoone yahay taban barta waxaad u raraysaa xagga bidix.

t) Haddii jibbaarka tobanku yahay abyoone togan barta waxaad u raraysaa xagga midigta.

Tusaale 5.

U qor 4.05×10^8 sansaan jajab tobanle.

Furfuris:

4.05×10^8 = 405000000.

Tusaale 6.

U qor tirooyinka soo socda qormo saynis.

b) 275.6000

j) 1000000

kh) 567890

r) 200

t) 0.00006785

x) 0.00000001

d) 6.837

Furfuris:

b) $275.6000 = 2.756 \times 10^2$

j) $1{,}000{,}000 = 1 \times 10^6$

kh) $567890 = 5.6789 \times 10^5$

r) $200 = 2 \times 10^2$

t) $0.00006785 = 6.785 \times 10^{-5}$

x) $0{,}000{,}000{,}01 = 1 \times 10^{-8}$

d) $6.837 = 6.837 \times 10^0$

Waxan nidhi tirada u qoran qormo saynis waa tiro ka weyn ama le'eg kow, kana yar toban laguna dhuftay jibbaar toban. Haddii aad u fiirsatid tusaalaha 6aad, xubinta b, 2.75 way ka weyn tahay kow tobanna way ka yar tahay; sidaas oo kale xubinta t, 6.785 way ka weyn tahay kow, weynaa ka yar tahay toban. Laakiin xubinta j iyo x, 1 wuxuu le'eg yahay kow.

Tusaale 7.

U qor sansaanta jajab tobanle.

b) 2.753×10^9

j) 4.078×10^{-1}

kh) 1×10^5

r) 3×10^{-2}

t) 3.63×10^{-6}

x) 5.078×10^0

d) 1×10^{-7}

Furfuris:

b) $2.753 \times 10^9 = 2{,}753{,}000{,}000$

j) $4.073 \times 10^{-1} = 0.4073$

kh) $1 \times 10^5 = 100{,}000$

r) $3 \times 10^{-2} = 0.03$

t) $3.63 \times 10^{-6} = 0.000{,}003{,}63$

x) $5.078 \times 10^0 = 5.078$

d) $1 \times 10^{-7} = 0.0000001$

Xusuusnow

Tiro u qoran qormo saynis waa tiro ka weyn ama le'eg kow, kana yar toban o ay ku dhafsan tahay toban ku jibbaaran abyoone. Ama tiro leh god qudha oo eber aan ahayn oo ka xiga bidix barta jajab tobanle.

Haddii lagu yiraahdo tiro u qor qormo saynis, marka hore qor tiradaa, barta jajab tobanlahana waxaad dhigtaa midigta godka u bidixeeya ee aan eber ahayn. Dabadeedna isu fiiri tiradii lagu siiyey iyo tan aad haysato. Tiri inta god ee aad soo rartay barta jajab-tobanlaha. Tirada inta god ee aad soo rartay barta jajab tobanluhu waxay ku siinaysaa jibbaarka tobanka lagu dhufanayo tirada dambe. Haddii barta midig aad u rartay, jibbaarku tiro taban ayuu noqonayaa, haddii bidix aad u rartayna wuxuu noqonayaa tiro togan.

Haddii aan rabno in aan u qorno sansaanta jajab tobanle tiro u qoran qormo saynis, waxan raraynaa barta jajab tobanlaha, tobanka iyo abyoonaha ku jibbaaran ee ku dhufsanna waa ka tageynaa. Jibaarka tibanku wuxuu inoo sheegaa inta god ee aan barta rarayno, summaddiisuna waxay inoo sheegaysaa xagga loo rarayo. Haddii jibbarku uu abyoone togan yahay, barta waxan u raraynaa xagga midig; haddii uu abyoone taban yahayna waxaan u rarayhaa xagga bidix.

Layli:

I. U qor tiro kasta qormo saynis.

b) Xawaaraha islaysku uu hawada ku dhex maro waa 186,000 mayl sakankiiba.

t) Elektoroonka cufkiisu waa:
0.000,000,000,000,000,000,000,91 maykaroogaraam.

j) Culaabta dayaxu waa:
73,500,000,000,000,000,000,000 kilogaraam.

x) Baydhka biyaha ah cufkiisu waa 373 garaam.

kh) Xawaaraha sanqadhu ay birta ku dhex marto waa 5200 mitir sakankiiba.

II. U qor tiro kasta oo hoos ku taal qormo saynis.

b) 453
t) 8
j) 21
x) 10
kh) 100
d) 0.00453
r) 0.8
s) 0.21
sh) 0.01
dh) 0.00001

III. U qor qormo saynis:

1) 4.8370
2) 030.780
3) 0.004346
4) 4356000000
5) 145670.321
6) 47.48
7) .8356
8) 0.00000001
9) 0.00000001
10) 0.000000600
11) 0.70001
12) 3.456000

IV. Qor tirooyinka hoos ku yaal adiga oo aan isticmaalayn jibbaarro.

1) 3×10^{8}
2) 4.7×10^{-1}
3) 5.435×10^{1}
4) 6.787×10^{-5}
5) 1×10^{-9}
6) 9×10^{-3}
7) 4.72345×10^{11}
8) 4.56×10^{0}
9) 4.301×10^{3}
10) 8.9×10^{-18}

V. U qor tirooyinka hoos ku yaal sansaanta jajab tobanle.

1) 4.4×10^{1}
2) 4.03×10^{2}
3) 5.7×10^{3}
4) 5.7×10^{3}
5) 6.0×10^{-3}
6) 2.63×10^{-30}
7) 8.0747×10^{20}
8) 9.843×10^{8}
9) 3.007×10^{-5}
10) 7.103×10^{-1}

VI. Tirooyinka hoos ku qoran ka dhig tirooyin afar god oo sugan leh, dabadeedna u qor qormo saynis.

1) 48.037600
2) 0.00000405034
3) 0.0001305807
4) 45678.76000
5) 800767.80
6) 43000000

7) 0.548978
8) 0.0043356
9) 484647000000
10) 4.8470897321

VII. Tirooyinka hoos ku yaal u beddel tirooyin afar god oo sugan leh, dabadeedna u qor sansaanta tobanle.

1) 4.83476×10^{-5}
2) 5.8363×10^{4}
3) 8.9097×10^{-3}
4) 4.80367×10^{8}
5) 7.06439×10^{-8}
6) 7.99998×10^{-3}
7) 3.66920×10^{5}
8) 2.7501×10^{-1}
9) 1.8411×10^{0}

VIII. Cabbiraadaha soo socda u beddel sentimitir, jawaabtana u qor qormo saynis.

1) 4 Km
2) 408 Dm
3) 23 mm
4) 0.00453
5) 8850 mitir
6) 0.000537 Dm
7) 0.00000057 Km
8) 0.0000008976 mitirs
9) 4.7 Km.
10) 28 Km.

QORMO SAYNIS IYO XISAABFAL

B. Isugeyn, kalagoyn iyo qormo saynis

Tusaale I.

Isku gee, 4.76×10^{3} iyo 3.678×10^{-4}

Furfuris:

$4.76 \times 10^{3} = 4760$

$3.678 \times 10^{-4} = 0.0003678$

Markaa

$4.76 \times 10^{3} + 3.678 \times 10^{-4} = 4760 + 0.0003678 = 4760.0003678.$

Dabadeedna u qor jawaabta qormo saynis.

Markaa

$4.76 \times 10^{3} + 3.678 \times 10^{-4} = 4760.000367 = 4.760000367 \times 10^{3}.$

Haddii lagu yiraahdo isku gee ama kala goo tirooyin u qoran qormo saynis, marka hore tira kasta u qor sansaanta tobanle, dabadeedna sida caadiga ah ugaga shaqee xisaabfalka lagu siiyay. U dambayn, u qor jawaabta qormo saynis.

Tusaale II.

Isugee 3.4467×10^{2} iyo 8.968×10^{4}

$3.4467 \times 10^{2} = 344.67$

$8.968 \times 10^{4} = 89680$

Markaa $3.4467 \times 10^{2} + 8.967 \times 10^{4} = 344.67 + 896780 =$

$90024.67 = 9.002467 \times 10^{4}$

Markaa $3.4467 \times 10^2 + 8.968 \times 10^4 = 9.002467 \times 10^4$

Tusaale III.

$8.92 \times 10^{-2} - 4.537 \times 10^{-3}$

$8.92 \times 10^{-2} = 0.0892$

$4.537 \times 10^{-3} = 0.004537$

Markaa $8.92 \times 10^{-2} - 4.537 \times 10^{-3} = 0.0892 - 0.004537$

$= 0.084663$

$= 8.4663 \times 10^{-2}$

Markaa $8.92 \times 10^{-2} - 4.537 \times 10^{-3} = 8.4663 \times 10^{-2}$

Ilaa intii aan soo marnay, waxaan isticmaalaynay tirooyin togan ee tirooyin toban maynaan isticmaalin. Qormada saynisku ma beddesho tiro. Tiradu haddii ay taban tahay, marka loo qoro qormo saynis, tabnaanteeda uun bay ahaan.

Tusaale IV.

U qor qormo saynis, -0.0004783

Furfuris:

$-0.0004783 = -4.783 \times 10^{-4}$

Tusaale V.

U qor tiro kasta qormo saynis

1) -4786
2) -0.002387
3) -470.83
4) -4.893

Furfuris:

1) $-4784 = -4.784 \times 10^3$
2) $-0.002387 = -2.387 \times 10^{-3}$
3) $-470.83 = -4.7083 \times 10^2$
4) $-4.893 = -4.893 \times 10^0$

Tusaale VI Fududee

$7.843 \times 10^1 - 6.3443 \times 10^3$

Furfuris:

$7.843 \times 10^1 = 78.43$

$6.3448 \times 10^3 = 6344.8$

Markaa $7.843 \times 10^1 - 6.34 \times 10^3 = 78.43 - 6344.8$

$= -6266.37$

$= -6.266337 \times 10^3$

Layli:

1 U qor qormo saynis

1) -48.43
2) -0.0000234
3) 40000
4) 56800
5) -683.7432

II Fududee

1) $4.37 \times 10^5 + 3.843 \times 10^4$
2) $3.4 \times 10^{-3} + 8.99 \times 10^{-3}$
3) $8.99 \times 10^2 + 9.876 \times 10^2$
4) $8.709 \times 10^2 + 9.817 \times 10^{-1}$
5) $9.9009 \times 10^3 + 8.773 \times 10^{-2} + 5.67 \times 10^{-3}$
6) $7.839 \times 10^{-2} - 6.293 \times 10^{-3}$
7) $6.7 \times 10^{-2} - 5.7 \times 10^{-2}$
8) $5.93 \times 10^{-5} - 3.08 \times 10^3$
9) $6.73 \times 10^{-3} - 5.006 \times 10^{-2}$
10) $8.11 \times 10^3 - 8.9 \times 10^{-2}$

T. Isku dhufashada, isu qaybinta iyo qormo saynis

Xusuuso xeerka jibbaarrada isku salka ah.

Haddii **a, m** iyo **n** ay yihiin abyooneyaal.

$a^m \times a^n = a^{m+n}$

$a^m \div a^n = a^{m-n}$

Haddii $a = 10$; $m = 5$; $n = 3$.

$a^m \times a^n = 10^5 \times 10^3 = 10^{5+3} = 10^8$

$a^m \div a^n = 10^5 \div 10^3 = 10^{5-3} = 10^2$

Innagoo ka faa'iideysanayna xeerka jibbaarrada, waxaan ka shaqayn karnaa tirooyin u qoran qormo saynis oo la isku dhuftay ama la isu qaybiyay.

Tusaale I: Fududee

$(3.72 \times 10^5) \times (1.3 \times 10^{-3})$

Furfuris:

$(3.72) \times 10^5) \times (1.3 \times 10^{-3}) = 3.72 \times 1.3 \times 10^5 \times 10^{-3}$

$= 3.72 \times 1.3 \times 10^{5+(-3)}$

$= 3.72 \times 1.3 \times 10^2$

$= 4.836 \times 10^2$

Mar haddii ay isku dhufashadu kala hormari karto, tobnaha jibbaaran ayaan dhinac marin karnaa, dabadeedna xeerka jibbaarrada ayaan isticmaali karnaa, sida kor ku muujisan.

Tusaale II: Fududee

$(8.97 \times 10^3) \times (9.63 \times 10^2)$

Furfuris:

$(8.97 \times 10^3) \times (9.63 \times 10^2) = 8.97 \times 9.63 \times 10^3 \times 10^2$

$= 8.97 \times 9.63 \times 10^{3+2}$

$= 8.97 \times 9.63 \times 10^5$

Taranta 8.97 iyo 9.63 waa 86.4711; u qor 86.4711 qormo saynis. Markaa $86.4711 = 8.64711 \times 10^1$.

Dabadeedna waxaan odhanaynaa

$$(8.97 \times 10^3) \times (9.63 \times 10^2) = 8.97 \times 9.63 \times 10^5$$
$$= 86.4711 \times 10^5$$
$$= 8.64711 \times 10^1 \times 10^5$$
$$= 8.64711 \times 10^{1+5}$$
$$= 8.64711 \times 10^6$$

Tusaale III.

Ka shaqee $(1.44 \times 10^5) \div (3.6 \times 10^3)$

Furfuris:

$$(1.44 \times 10^5) \div (3.6 \times 10^3) = \frac{1.44 \times 10^5}{3.6 \times 10^3}$$
$$= \frac{1.44 \times 10^{5-3}}{3.6}$$
$$= \frac{1.44 \times 10^2}{3.6}$$
$$= 0.4 \times 10^2$$
$$= 4 \times 10^{-1} \times 10^2$$
$$= 4 \times 10^{-1+2}$$
$$= 4 \times 10^1$$

Haddii lagu yidhaahdo isku dhufo ama isu qaybi tirooyin u qoran qormo saynis marka hore isku gee jibbaarrada tobnaha haddii ay isku dhufsan yihhin, haddii ay isu qaybsan yihiinna kala gco jibbaarrada, marka xiga isku dhufo ama isu qaybi tirooyinka hadhay, jawaabtana u qor qormo saynis. Jibbaarka toban ee hore kuugu soo baxay, iyo ka danbe isu gee.

Layli:

I Fududee

1) $(4.83 \times 10^5) \times (9.31 \times 10^{-8})$
2) $(9.2 \times 10^3) \times (1.5 \times 10^2)$
3) $(8.6 \times 10^{-5}) \div (2.2 \times 10^{-7})$
4) $(2.56 \times 10^5) \div (3.2 \times 10^{-5})$
5) $(4.64 \times 10^{-5}) \div (8 \times 10^{-4})$
6) $(1.2 \times 10^{-5}) \div (9.6 \times 10^6)$
7) $(4.8 \times 10^2) \div (2.5 \times 10^{-4})$
8) $(3.32 \times 10^{-3}) \div (2.1 \times 10^7)$
9) $(4.84 \times 10^{-5}) \div (2.1 \times 10^{-3})$
10) $(1.4 \times 10^7) \div (1.4 \times 10^{-8})$

LOGARDAMKA CAADIGA AH

Q e e x:

Tiro kasta waxa loo qori karaa toban tiro ku jibbaaran. Jibbaarka tobanka waxa la yidhaa logardamka caadiga ah ee tirada. Tobanka waxa la yidhaa salka logardamka.

Tusaale ahaan, u fiirso tusaha hoos ku yaal:

$$\begin{aligned} 100{,}000 &= 10^5 \\ 10{,}000 &= 10^4 \\ 1{,}000 &= 10^3 \\ 100 &= 10^2 \\ 10 &= 10^1 \\ 1 &= 10^0 \\ 0.1 &= 10^{-1} \\ .01 &= 10^{-2} \\ .001 &= 10^{-3} \end{aligned}$$

Tusaha kor ku yaal waxaan ka arkaynaa in 10,000 loo qori karo 10^4. Afarta (4) oo ah jibbaarka tobanka waxa weeye logaardamka caadiga ee 10,000. Tobanku waa salka logardamka. Sidaas oo kale 0.001 waxa loo qori karaa 10^{-3}. Saddexda taban (— 3) oo ah jibbaarka tobanku waa logardamka 0.001. Waxa loo qoraa sida hoos ku taal.

$$\text{Log}_{10}\ 10{,}000 = 4$$

$$\text{Kog}_{10}\ 0.001 = -3$$

Waxana loo akhriyaa logardamka 10,000 ee sal toban waa 4; logardamka 0.001 ee sal toban waa — 3, logardamka waa la soo gaabiyaa oo waxa la yidhaa Log.

Tusaale I

Raadi logardamka caadiga ah ee 1,000,000

F u r f u r i s:

1,000,000 waxay la mid tahay 10^6

Markaa, logardamka caadiga ah ee 1,000,000 waa 6.

ama

$\text{Log}_{10}\ 1{,}000{,}000 = 6$

Tusaale II

Raadi Logardamka caadiga ah ee 0.0001

Furfuris:

0.0001 wuxuu la mid yahay 10^{-4}

Markaa Logardamka Caadiga ah ee 0.0001 waa — 4 ama $\text{Log}_{10}\ 0.0001 = -4$.

Waxaan ka arkaynaa tusaalooyinka kor ku qoran in uu Logardamku yahay jibbaarka tobanka marka tirada loo qoro tiro toban ku jibbaaran. Haddii lagu yidhaahdo raadi tiro logardamkeeda, marka hore waxad ka dhigtaa tirada, toban tiro ku jibbaaran. Jibbaarka tobanka ayaa ah Logardamka Caadiga ah ee tirada.

Layli:

Raadi Logardamka Caadiga ah ee

1) 10
2) 100
3) 0.01
4) 0.0001
5) 0.000001
6) 1,000,000
7) $\frac{1}{10}$
8) $\frac{1}{100}$
9) 1
10) 1,000,000,000.

Waxan nidhi Logardamka caadiga ah ee 1000waa 3.
ama $\text{Log}_{10}\ 1000 = 3$. Waxaanan u akhrinaa Logardamka 1000 ee sal toban waa 3. Haddaba looma baahna in aan nidhaahno "Logardamka Caadiga ah"; waxan odhanaynaa "Logardamka" oo kaliya. Tusaale ahaan, waxaan odhanaynaa Logardamka 1000 waa 3 waxaanan u qoraynaa, Log 1000 = 3. Tobankii salka u ahaa looma baahna in lagu hoos qoro. U fiirso tusaha hoos ku qoran.

$$\text{Log } 10 = 1$$
$$\text{Log } 1 = 0$$
$$\text{Log } 100 = 2$$
$$\text{Log } 0.001 = -3$$
$$\text{Log } \frac{1}{100} = \text{Log } 0.01 = -2$$

Haddii la yidhaahdo Log 100 = 2, waxaan u fahmaynaa in Logardamka Caadiga ah ee 100, ama Logardamka 100 sal toban uu yahay 2. Hadda la hor waxaan sheegnay sida loo raadiyo Logardamka tirooyinka loo qori karo toban abyoone ku jibbaaran. Bal u fiirso tirooyinkii aan Logardamkooda sheegnay oo dhan.

Mid walba waxa loo qori karayey toban abyoone ku jibbaaran. Haddaba, sidee loo helki karaa Logardamka tirooyinka kale. Inta aynaan taa bilaabin, bal aan u fiirsanno Logardamka kow iyo Logardamka toban. Logardamka 1 waa 0, Logardamka 10 waa 1. Mana jiro abyoone u dhexeeya 0 iyo 1. Markaa, Logardamka tirooyinka u dhexeeya 1 iyo 10 waxay noqonayaan tirooyin ka weyn eber kana yar kow. Sidaas oo kale, waxaan arki karnaa in logardamka tirooyinka u dhexeya 10 iyo 100 ay noqonayaan tirooyin ka weyn 1, kana yar 2, waayo Logardamka 10 waa 1, Logardamka 100 waa 2.

Tirooyinka loo qori karo toban tiro ku jibbaaran, Logardamkooda dhib yaraan baa loo heli karaa. Sidaan hore u soo sheegnay, laakiin — tirooyinka kale Logardamkooda korka lagama sheegi karo. Markaa culimadu way raadiyeen Logaramka tiro kasta, waxayna ku qoran yihiin tuse gaar ah oo la yidhaahdo tusaha Logardamka.

Tusaale ahaan, Logardamka 2 marka tusaha laga fiiriyo waa 0.3010. U fiirso in 0.3010 ay tahay tiro jajab tobanle ah oo ka weyn 0 kana yar 1.

Waxan odhan karnaa haddii logardamka 2 uu yahay 0.3010, 2 waxay la mid tahay 10 ku jibbaaran 0.3010 ama $2 = 10^{0.3010}$, 20 waxa loo qori karaa 2×10 ama $10^{0.3010} \times 10^1$ waayo 2 ayaa la mid ah $10^{0.3010}$. Haddii aan xeerkii jibbaarrada eegno, $10^{0.3010} \times 10^1$ waxay la mid tahay $10^{1+0.3010}$. Markaa $20 = 10^1 \times 10^{0.3010} = 10^{1+0.3010}$. Markaa Logaramka 20 waa $10^{1+0.3010}$. Bal u fiirso tirada 0.002. Waxaan arki karnaa in $0.002 = 2 \times 10^{-3}$; laakiin 2×10^{-3}

waxay la mid $10^{0.3010} \times 10^{-3}$. Haddii aan xeerkii jibbaarrada raacno $10^{0.3010} \times 10^{-3} = 10^{-3+0.3010}$. Markaa Logardamka 0.002 waxa uu yahay $-3 + .3010$.

Waxaan tusaalooyinka kor ku qoran ka arki karnaa in Logardamka tiro kasta laga dhigi karo abyoone loo geeyey tiro jabjab tobanle ah. Logardamka inta abyoone ah waxa la yidhaa abyan inta jajab tobanle ahna waxa la yidhaa qurub.

Tusaalihii hore, Logardamka 2 wuxuu ahaa 0.3010, eberku waa abyan, .3010 waa qurub; Logardamka 20 waxa uu ahaa $1 + .3010$, 1 waa abyan, .3010na waa qurub, Logardamka 0.002 wuxuu ahaa $-3 + .3010$; -3 waa abyan .3010na waa qurub.

Bal u fiirso in qurubka Logardamka 2,20 iyo 0.002 uu isla mid yahay laakiin abyanka Logardamka uu kala duwan yahay.

Bal aad ugu fiirso tusaha hoos ku yaal adoo ofgsoon in $2 = 10^{0.3010}$

Tiro	Qormo Saynis	Log.	Abyan	Qurub
0.0002	$2 \times 10^{-4} = 10^{0.3010} \times 10^{-4} = 10^{-4+.3010}$	$-4 + .3010$	-4	.3010
0.002	$2 \times 10^{-3} = 10^{0.3010} \times 10^{-3} = 10^{-2+.301}$	$-3 + .3010$	-3	.3010
0.02	$2 \times 10^{-2} = 10^{0.3010} \times 10^{-2} = 10^{-2+.301}$	$-2 + .3010$	-2	.3010
0.2	$2 \times 10^{-1} = 10^{0.3010} \times 10^{-1} = 10^{-1+.301}$	$-1 + .3010$	-1	.3010
2.0	$2 \times 10^{0} = 10^{0.3010} \times 10^{0} = 10^{0+.301}$	$-0 + .3010$	-0	.3010
20	$2 \times 10^{1} = 10^{0.3010} \times 10^{1} = 10^{1+.301}$	$1 + .3010$	1	.3010
200	$2 \times 10^{2} = 10^{0.3010} \times 10^{2} = 10^{2+.301}$	$2 + .3010$	2	.3010
2000	$2 \times 10^{3} = 10^{0.3010} \times 10^{3} = 10^{3+.301}$	$3 + .3010$	3	.3010

Tusaha waxan ka arki karnaa in abyanka Logardamka tirooyinka kor ku qorani uu yahay jibaarka toban marka tirada loo qoro qormo saynis. Abyanku waa abyoone togan ama taban sidaan hore u soo sheegnay, laakiin qurubku waa jajab-tobanle oo ka weyn eber. Logardamka tiradu waa wadarta abyanka iyo qurubka.

ABYAN RAADIN

Haddii lagu yidhahdo raadi Logardamka tiro, marka hore waxaad raadisaa abyanka Logardamka. Markaad tirada u qorto qormo saynis, jibbaarka tobanka ayaa ah abyanka Logardamka.

Tusaale I:

Raadi abyanka Logardamka 417.3

Furfuris:

417.3 waxay noqonaysaa marka qormo saynis loo qoro 4.173×10^2. Abyanka Logardamka 417.3 waa 2.

Tusaale II:

Waa maxay abyanka Logardamka tirooyinka hoos ku yaal 4131.4; 87; 293.4; 8432; 5,000,000; 0.0002134; 5.617; 0.7; 0.00813; 0.0000001; 8; 9; 1.

Furfuris:

Tiro	Qormo Saynis	Abyanka Logardamka
4131.4	4.1314×10^3	3
87	8.7×10^1	1
293.4	2.934×10^2	2
8,432	8.432×10^3	3
5,000,000	$5. \times 10^6$	6
0.0002134	2.134×10	-4
5.617	5.617×10^0	0
0.7	7×10^{-1}	-1
0.00813	8.13×10^{-3}	-3
0.000,0001	1×10^{-6}	-6
8	8×10^0	0
9	9×10^0	0
1	1×10^0	0

Inkasta oo ay qomo jiraan siyaabo kale oo loo raadin karo abyanka Logardamka waxa ugu wanaagsan habka qormo saynis. Mar labaad ogsoonow in abyanka Logardamka ee tiro uu yahay jibbaarka tobanka marka tirada loo qoro Qormo Saynis.

Layli:

Raadi abyanka Logardamka ee tirooyinka hoos ku yaal:

1) 43447
2) 48.45
3) 145.678
4) 0.0007685
5) 4
6) 32
7) 3.2
8) 320
9) 4.456
10) 44.56
11) 0.0000484
12) 0.484
13) $\frac{1}{5}$
14) $\frac{1}{2}$
15) $3\frac{2}{25}$
16) $1\frac{8}{40}$
17) $4\frac{1}{3}$
18) 13.5
19) 1.35
20) $\frac{1}{1,000,000}$

Xusuus:

Inta aanad raadin abyanka Logardamka, ka dhig jajab-tobanle tirooyinka jajabyada ah.

QURUBKA:

Sidii aan horey u sheegnay, waxa jira tuse sheegaya Logardamka tirooyinka aan loo qori karin toban abyoone ku jibbaaran, sida 2, 20, 34. Tusuhu wuxuu inoo sheegaa qurubka Logardamka laakiin abyanka sidii aan horey u sheegnay ayaa loo raadiyaa. Hoos waxa ku yaal tuse yar oo ah qayb laga soo guuriyey tusaha Logardamka.

											1 2 3	4 5 6	7 8 9
x	0	1	2	3	4	5	6	7	8	9	FARAQ		
50	.6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1 2 3	4 4 5	6 7 8
51	.7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1 2 2	3 4 5	6 6 7
52	.7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1 2 2	3 4 5	6 6 7
53	.7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1 2 2	3 4 5	6 6 7

Tusaha Logardamku wuxuu leeyahay saddex qaybood, qaybta koowaad oo ay ku qoran yihiin tirooyin leh laba god oo ka bilaabma 10 kuna dhammaada 99. Qaybtaasi waxay ka kooban tahay hal joogutax oo kaliya. Qaybta labaad waxay ka kooban tahay toban joogutax, kuwaas oo ah kuwa ku hoos qoran tirooyinka 0, 1, ilaa 9. Qaybta saddexaad, oo tusayaasha oo dhammi ayna wada qorin waa qaybta erayga "faraq"uu ku dul qoran yahay ee ka kooban sagaalka joogutax.

Haddii aan tusaha kor ku qoran aan dib ugu soo noqonno qaybta hore ee tusuhu waa joogutaxa ay "x" ku dul qoran tahay ee tirooyinka 50, 51, 52 iyo 53 ay ku jiraan. Qaybta labaad waa ta ku xigta ee tobanka joogutax ka kooban, ta saddexaadna waa ta ugu dambeysa ee "faraq" ku qoran yahay.

Sida tusaha looga akhriyo qurubka

Ka soo qaad in lagu yidhaahdo sheeg qurubka Logardamka 5. Ugu horrayn tiro kasta oo Logardamkeeda la rabo waxaad ka dhigaysaa tiro leh afar god oo sugan.

Marka xiga waxaad u qoraysaa qormo saynis. Markaa 5 waxaad ka dhigaysaa 5.000×10^0. Labada god ee bidix u soo xiga waxaad ka eegaysaa qaybta koowaad ee tusaha, godka ku xigana waxaad ka eegaysaa qaybta labaad ee tusaha, godka afraad ee tirada waxaad ka eegaysaa,qaybta saddexaad ee tusaha. Haddaba, marka aan qurubka 5 rabno waxan u qoraynaa 5.000×10^0. Labada god ee bidix u xiga waa 5.0, ta saddexaadna waa eber, ta afraadna waa eber. Qaybta kowaad ee tusaha waxad ka helaysaa 50. Qaybta labaad waxaad ka helaysaa joogutaxa uu eber ugu sareeyo. Ta afraadna eber ma leh. Markaa qurubka 5.000 waxa weeye tirada ku qoran halka ay ku kulmaan jiifutaxa ay 50 ku jirto iyo joogutaxa qaybta labaad ee 0 ugu horreeyo.

											1 2 3	4 5 6	7 8 9
x	0	1	2	3	4	5	6	7	8	9	FARAQ		
50	.6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1 2 3	4 4 5	6 7 8
51	.7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1 2 2	3 4 5	6 6 7
52	.7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1 2 2	3 4 5	6 6 7
53	.7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1 2 2	3 4 5	6 6 7

Tusaha kor ku yaal waxan ka arkaynaa in tiradaasi ay tahay .6990.

Sidaas oo kale haddii lagu yidhaahdo raadi qurubka 51.2, marka hore 51.2 waxaad u qoraysaa 5.120×10^{1}. 51 waxaad ka eegaysaa qaybta kowaad ee tusaha, 2na waxaad ka eegaysaa qaybta labaad ee tusaha. Qurubka 51.2 wuxuu noqonayaa tirada ku qoran halka ay ku kulmaan jiifutaxa uu 51 ku jiro iyo joogutaxa uu 2 ugu korreeyo. Markaa,qurubka 51.2 waa .7093.

											1 2 3	4 5 6	7 8 9
x	0	1	2	3	4	5	6	7	8	9	FARAQ		
50	.6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1 2 3	4 4 5	6 7 8
51	.7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1 2 2	3 4 5	6 6 7
52	.7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1 2 2	3 4 5	6 6 7
53	.7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1 2 2	3 4 5	6 6 7

Tusaale I

Raadi qurubka 0.00537

Furfuris:

0.00537 waxa loo qori karaa 5.370×10^{-3}.
Jiifutaxa 53 iyo joogutaxa 7 meesha ay ku kulmaan marka aan tusaha ka fiirinno waxaa ku qoran tirada .7300. Markaa, qurubka 0.00537 waa .7300.

Tusaale II

Raadi qurubka Logardamka 52900.

Furfuris:

52900 marka laga dhigo afar god oo sugan, loona qoro qormo saynis, waxay noqonaysaa 5.290×10^{4}. Meesha ay ku kulmaan jiifutaxa 52 iyo joogutaxa 9 waxa ku taal tirada 7235. Markaa qurubka 52900 waa .7235.

Tusaale III

Doon qurubka Logardamka 52.87

Furfuris:

Marka 52.87 laga dhigo afar god oo sugan, ee loo qoro qormo saynis waxay noqonaysaa 5.287×10^{1}. Sidii aan soo sheegnay, labada god ee 5.287 ee bidix u xiga, oo ah 5.2 waxa laga fiirinayaa qaybta kowaad ee tusaha, godka saddexaad oo 8 ahna waxa laga eegayaa qaybta labaad ee tusaha. Jiifutaxa 52 iyo joogutaxa 8 waxay ku kulmaan meesha ay ku qoran tahay tirada 7226. Haddana waxaad eegaysaa meesha ay ku kulmaan jiifutaxa 52 iyo joogutaxa 7 ee qaybta saddexaad ee tusaha. Halka ay ku kulmaan waxa ku qoran tirada 6. Marka waxaad isu geysaa 7226 iyo 6. Waxay isku noqdaan 7232. Tirada .7232 waxa weeye qurubka 52.87.

											1 2 3	4 5 6	7 8 9
x	0	1	2	3	4	5	6	7	8	9	FARAQ		
50	.6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1 2 3	4 4 5	6 7 8
51	.7076	7084	7093	7101	7110	7118	7125	7135	7143	7152	1 2 2	3 4 5	6 6 7
52	.7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1 2 2	3 4 5	6 6 7
53	.7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1 2 2	3 4 5	6 6 7

Mar kale xusuuso, in marka la rabo qurubka Logardamka tiro, in tirada marka hore laga dhigo 4 god oo sugan, loona qoro qormo saynis. Labada god ee tirada bidix ugu xiga waxa laga raadiyaa qaybta koowaad ee tusaha logardamka, godka ku xigana waxa laga raadiyaa qaybta labaad ee tusaha, ka midigta ugu xigana waxa laga raadiyaa qaybta saddexaad ee tusaha. Markaa qurubka Logardamku wuxuu noqonayaa, tirada ku qoran meesha ay ku kulmaan labada god ee hore iyo joogutaxa godka saddexad oo loo geeyey tirada ku qoran meesha ay ku kulmaan jiifutaxa labada god ee hore iyo joogutaxa godka afraad oo laga helo qaybta saddexaad ee tusaha Logardamka.

Tusaale IV

Raadi qurubka Logardamka 51.968.

Furfuris:

Waxaad ka dhigtaa 51.968 tiro leh afar god oo sugan. Waxay noqonaysaa 51.97. U qor qormo saynis. Waxay noqonaysaa 5.197×10^1. Haddii aan tusihii fiirinno, waxaan arkaynaa in jiifutaxa 51 iyo joogutaxa 9 ee qaybta labaad ay inna siinayaan tirada 7152. Jiifutaxa 51 iyo joogutaxa 7 ee qaybta saddexaad waxay ina siinayaan tirada 6. Wadarta 7152 iyo 6 waa 7158. Marka qurubka Logaramka 51.97 waa .7151.

Layli:

Raadi qurubka Logardamka tirooyinka.

I. 1) 5 2) 8
3) 9 4) 52
5) 60 6) 0.5
7) 0.0008 8) 8000
9) 0.06 10) 6

II. 1) .00706 2) 706000
3) 89.3 4) 0.0000893
5) 4 6) 40
7) 4000 8) 0.000004

III. 1) 0.008101 2) 0.8011
3) 0.00009999 4) 9999000
5) 4.534 6) 4834
7) 483.4 8) 4.834
9) 5001 10) 6070

IV. 1) 0.41078 2) 0.52332 3) 0456748
4) 0.0004976503 5) 4.0678 6) 405.47
7) 0.001100789 8) 1000 9) 10027
10) 1001.343

LOGARDAM

Logardamka tiro, sidaan horey u sheegnay, waa wadarta abyanka iyo qurubka. Markaa haddii aan rabno in aan helno logardamka tiro, marka hore tiradaan ka dhigaynaa afar god oo sugan, marka xigana waxaynu u qoraynaa qormo saynis. Abyanka iyo qurubka Loga-

ramka ee tirada mid walba waxan u raadinaynaa sidii aan hore u soo sheegnay; wadarta abyanka iyo qurubku waxay inna siinaysaa Logardamka tirada.

Tusaale:

raadi Logardamka 52870

Furfuris:

Marka aan tirada u qorno qormo saynis waxay noqonaysaa 5.287×10^4. Abyanka tiradani waa 4. Qurubka waxaad ka raadisaa tusaha. Waxa uu qurubku noqonayaa .7232. Markaa, Logardamka 52870 waa 4 + .7232. Waxa loo qori karaa 4.7232.

Tusaale:

Doon Logardamka tirooyinka

52.9, 5290, .000529, 5.29, 5290000

Furfuris:

Tiro	Qormo Saynis	Abyan	Qurub		Logardam	
52.9	5.29×10^1	1	.7235	1	+ .7235	= 1.7235
5290	5.29×10^3	3	.7235	3	+ .7235	= 3.7235
.000529	5.29×10^{-4}	— 4	.7235	— 4	+ .7235	= ?
5.29	5.29×10^0	0	.7235	0	+ .7235	= 0.7235
.529	5.29×10^{-1}	— 1	.7235	— 1	+ .7235	= ?
5290000	5.29×10^{-6}	6	.7235	6	+ .7235	= 6.7235

Haddii aad u fiirsatid tusaalaha kor ku yaal, waxaad arkaysaa in qurub iyo abyan wadartoodu ay tahay barta jajab-tobanle oo loo dhaxaysiiyo abyanka iyo qurubka marka uu abyanku abyoone togan yahay, laakiin haddii uu abyoone taban yahay, sidaan soo sheegnay looma qori karo, waayo (— 3) + (0.324) iyo — 3.324 isla mid maaha. — 3.324 waxay la mid tahay (— 3) + (— 0.324); qurubku tiro taban maaha ee waa tiro togan. Markaa, (— 3) + (0.324) waxa loo qoraa $\bar{3}.324$. Jiitinta 3 kor ka saarán waxay sheegaysaa in abyanku uu yahay tiro taban, qurubkuna uu yahay tiro togan. Waxa kale oo loo qori karaa 7.324 — 10 ama 6.324; abyanka oo ah $\bar{3}$ wuxuu la mid yahay 7 — 10 ama — 3, sidaas oo kale 6 — 9 waxay la mid tahay — 3. $\bar{3}.324$ ma loo qori karaa 2.324 — 5? Haa, waayo 2 — 5 waxay la mid tahay — 3.

Tusaale:

Waa imisa Logardamka 532.4

Furfuris:

$532.4 = 5.324 \times 10^2$

Log 532.4 = 2.7261

Tusaale:

Sheeg Logardamka 0.0005324.

Furfuris:

$0.0005324 = 5.324 \times 10^{-4}$

Log 0.0005324 = $\bar{4}$.7261

ama 6.7261 — 10

Layli:

Raadi Logardamka tirooyinkan:

1)	4534	2)	23.47	3)	41.73
4)	0.4173	5)	417300	6)	410.8
7)	42.743	8)	0.0048719	9)	48997.6
10)	0.00056998	11)	16,000,000	12)	1,000,000,000
13)	2	14)	0.0005	15)	0.000613
16)	1	17)	10089	18)	1.099
19)	0.400097	20)	44.44		

LIDLOGARDAM

Qeex:

Haddii lagu siiyo Logardamka tiro, tirada waxa la yidhaa Lidka Logardamka waxaana loo soo gaabiyaa, Lidlog.

Marka la raadinayo lidka logaramka, waxa jira tuse qora lidka logardamka. Sidi tusihii logardamka oo kale, tusaha lidloggu wuxuu leeyahay saddex qaybood. Qaybta hore, tirooyin laba god leh oo ka bilaabma .00 kuna dhammaada .99 ayaa ku qoran. Qaybta labaad iyo qaybta saddexaad waxay u eg yihiin qaybihii tusaha Logardamka ee ku beegan. Qurubka logardamka lagu siiyey wuxuu ku siiyaa lidlogga abyankuna waxay kuu sheegaysaa meesha ay bartu ku dhacayso.

Hoos waxa ku yaal qayb tusaha lidlog ka mid ah:

											1 2 3	4 5 6	7 8 9
z	0	1	2	3	4	5	6	7	8	9	FARAQ		
.08	1202	1205	1208	1211	1213	1216	1219	1222	1225	1227	0 1 1	1 1 2	2 2 3
.09	1230	1233	1236	1239	1242	1245	1247	1250	1253	1256	0 1 1	1 1 2	2 2 3
.10	1259	1262	1265	1268	1271	1274	1276	1279	1282	1285	0 1 1	1 1 2	2 2 3
.11	1288	1291	1294	1297	1300	1303	1306	1309	1312	1315	0 1 1	1 2 2	2 2 3
.12	1318	1321	1324	1327	1330	1334	1337	1340	1343	1346	0 1 1	1 2 2	2 2 3

Kaba dhig in lagu yidhi raadi lidka logardamka 2.1273. 2.1273 waa logardamka, markaaa 2 waa abyan, .1273 waa qurub. Tusaha lidlogga waxa laga helaa qurubka. Markaa, qaybta kowaad ee tusaha lidlog waxaad ka helaysaa .12. Jiifutaxa .12 iyo joogutaxa 7 ee qaybta labaad ee tusaha lidlog waxay ku siinayaan tirada 1340 Jiifutaxa .12 iyo joogutaxa 3 waxay ku siinayaan tirada 1. Wadarta 1340 iyo 1 waa 1341. Markaa lidlogga 2.1273 waa 1.341×10^2. Had iyo jeer, lidlogga aad tusaha ka heshid waxaad u qaadanaysaa tiro u qoran qormo saynis, oo jibbaarka tobankuna uu yahay abyanka logardamkii lagu siiyay. (Ogsoonow, haddii lagu yidhaa raadi lidlogga tiro, inay tiradaasi tahay logardam). Ugu dambayn, tirada u qoran qormo saynis, waxaad ka dhigaysaa tiro u qoran sansaanta jajab-tobanle. Markaa 1.341×10^2 waxay noqonaysaa 134.1.

Markaa lidlog $2.1273 = 0.341 \times 10^2 = 134.1$

Tusaale:

Raadi lidlog $\bar{4}.1138$

Furfuris:

Tusaha lidlog ee kor ku qoran marka aan fiirinno, jiifutaxa .11 ee qaybta kowaad iyo joogutaxa 3 ee qaybta labaad waxay ku kulmaan meesha ay ku qoran tahay 1297. Meesha ay ku kulmaan jiifutaxa .11 iyo joogutaxa 8 ee qaybta saddexaad ee tusaha lidlog waxa ku qoran 2. Wadarta 1297 iyo 2 waa 1299. Markaa lidlog 4.1138 waa 1.299×10^{-4}. Marka aan tiradaa ka dhigno tiro u qoran sansaanta jajab-tobanle waxay noqonaysaa 0.0001299. Markaa,

lidlog $\bar{4}.1138 = 0.0001299$.

Tusaale:

Waa imisa lidlog 4.0124

Furfuris:

Jiifutaxa .01 ee qaybta kowaad ee tusaha lidlog iyo joogutaxa 2 waxay ku siinayaan tirada 1028. Jiifutaxa .01 iyo joogutaxa 4 ee qaybta saddexaad ee tusaha lidlog waxay ku siinayaan 1. Wadarta 1028 iyo 1 waa 1029. Markaa lidlog 4.0124 waa 1.029×10^4 ama 10290.

Tusaale:

Raadi lidlog 0.0008

Furfuris:

Jiifutaxa .00 ee qaybta kowaad iyo joogutaxa 0 ee qaybta labaad waxay ku siinayaan 1000. Jiifutaxa .00 iyo joogutaxa 8 ee qaybta saddexaad waxay ku siinayaan 2. Wadarta 1000 iyo 2 waa 1002. Marka lidlog 0.0008 waxa uu yahau 1.002×10^0 ama 1.002.

Waxaad qoraysaa lidlog 0.0008 = 1.002.

Layli:

Raadi lidlogga tiro kasta oo hoos ku qoran:

1) 1.0607	2) 2.4742	3) 5.8395
4) $\bar{4}.3030$	5) $\bar{1}.4100$	6) $\bar{2}.0013$
7) $\bar{7}.1010$	8) 4.7774	9) 6.4669
10) 5.8383	11) 3.9999	12) $\bar{2}.4800$
13) 1.2000	14) 0.2131	15) 0.0001
16) 2.2131	17) 7.0121 — 8	18) 4.477 — 6
19) 0.4900 — 1	20) 0.8494 — 3	21) 4.7474 — 4
22) 1.9074 — 4	23) 1.0000	24) $\bar{4}.0000$

KU SHAQAYNTA LOGARDAMKA

Logardamku wuxuu inoo fududeynayaa isku dhufashada iyo isu qaybinta tirooyinka waaweyn, isla markaana wuxuu inoo suuragelinayaa raadinta jibbaarka iyo xididka jibbaarka tirooyinka.

1. Logardamka iyo iskudhufasho

Xusuusǫ xeerarka jibbaarrada. Haddii m iyo n ay yihiin tirooyin, b ay tahay tiro abyoone ah,

(1) $b^m \times b^n = b^{m+n}$

(2) $(b^m) \div b^n = b^{m-n}$

(3) $(b^m)^n = b^{mn}$

(4) $(b^m)^{\frac{1}{n}} = b^{\frac{m}{n}}$

Hadda, bal mar labaad aan ku celino qeexdii Logardamka. Logardamka tiro waa jibbaarka tobanka marka tirada loo qoro toban tiro ku jibbaaran. Tusaale ahaan Logardamka 50 waa 1.6990. Intaa micnaheedu waxay tahay: 50 wuxuu la mid yahay $10^{1.6990}$ Sidaas oo kale, Logardamka 240 waa 2.3802 waxay tahay, $240 = 10^{2.3802}$.

Markaa 50×240 waxaa loo qori kaaa $10^{1.6990} \times 10^{2.3802}$. Laakiin labada tiro salkoodu waa isla mid oo waa 10. Markaa, waxan leenahay $10^{1.6990} \times 10^{2.3802} = 10^{1.6990+22802} = 10^{4.0792}$. Haddii 50×240 ay le'eg tahay $10^{4.0792}$, markaa 4.0792 waa Logardamka 50×240.

Log $(50 \times 240) = 4.792 = 1.6990 + 2.3802 =$ Log 50 + Log 240. Halkaa waxaan ka arkaynaa in Logardamka taranta laba tiro uu le'eg yahay logardamkii tirooyinka oo la isu geeyey. Guud ahaan: Log (ab) = Log a + Log b. Haddii a iyo b ay yihiin tirooyin togan.

Dib aynu ugu noqonno taranta 50 iyo 240.

$50 \times 240 = 12000$. Ma jirtaa si kale oo aan u heli karno 12000? Haa, waayo, Logardamka 12000 ama Log $(50 \times 240) = 4.0792$, markaa waan heli karnaa tirada Logardamkeedu yahay 4.0972. Tirada Logardamku yahay 4.0792 waa lidlogga 4.0792. Tusaha lidlog wuxuu ina siinayaa in lidlog 4.0972 = 12000. Mararka qaarkood, tirada ugu dhaw ayaa la qaataa.

Tusaale:

Isku dhufo 4.157 iyo 36.92

Log (4.157×36.92) = Log 4.157 + Log 36.92

Log 4.157 = 0.6188

Log 36.92 = 1.5672

Log (4.157×36.92) = 2.1860

4.157×36.92 = lidlog 2.1860

= 153.5

Tusaale:

Isku dhufo (700.8×0.00148)

Log (700.8×0.00148) = Log 700.8 + Log 0.00148

Log 700.8 = 2.8456

Log 0.00148 = $\bar{3}$.1703

Log $(700.8 \times 0.00148) = 0.0159$

700.8×0.00148 = Lidlog 0.0159

= 1.037

Tusaale:

Isku dhufo $4.130 \times 0.083 \times 4.33$

$\text{Log}(4.13 \times 0.083 \times 4.33) = \text{Log } 4.13 + \text{Log } 0.083 + \text{Log } 4.33$

$\text{Log } 4.13 = 0.6160$

$\text{Log } 0.083 = \bar{2}.9191$

$\text{Log } 4.33 = 0.6365$

$\text{Log}(4.13 \times 0.083 \times 4.33) = 0.1716$

$4.13 \times 0.085 \times 4.33 = \text{Lidlog } 0.1716$

$= 1.485$

Layli:

I. Raadi taranta tirooyinkan isku dhufsan adoo isticmaalaya Logardam.

1) 814×925
2) 26.3×15.3
3) 3.08×475
4) $813 \times 41.74 \times 0.4347$
5) 6.27×6.27
6) $13.78 \times 13.78 \times 13.78$
7) 29×42.3
8) 916×3.18
9) 63.5×0.83
10) 0.00083×0.298
11) 0.00998×0.08998
12) 4.49×0.0056
13) 478.4×0.003947
14) 43.44×0.00023
15) $320 \times 320 \times 320$
16) $4.7 \times 4.7 \times 9.99$
17) $0.09 \times 4.7 \times 0.0099$
18) 83.33×4.414
19) $99 \times 99 \times 0.00099$
20) $47.47 \times 88.88 \times 0.0000015$

II. Haddii lagu siiyo Logardamka $2 = 0.3010$, Logardamka $3 = 0.4771$, iyo Logardamka $5 = 0.6990$. Raadi Log adoon tuse isticmaalayn.

1) $\text{Log}(2 \times 2)$
2) $\text{Log}(2 \times 3)$
3) $\text{Log}(2 \times 8)$
4) Log 20
5) Log 30
6) Log 300
7) Log 6000
8) Log 0.0015
9) Log 0.0027
10) Log 48

III. Raadi lidlogga jawaabaha su'aalaha (II)

IV. $\text{Log } a + \text{Log } b = \text{Log}(ab)$

Sansaanta kor ku qoran oo kale u qor:

1. $\text{Log } 2 + \text{Log } 5$
2. $\text{Log } 2.34 + \text{Log } 20$
3. $\text{Log } 4.48 + \text{Log } 50$

4. Log 2.23 + Log 1.1

5. Log 2.34 + Log 22

Logardamka iyo Isku qaybinta

Haddii Logardamka 240 uu yahay 2.3802, Logardamka 8 uu yahay 0.9031, $240 = 10^{2.3802}$; $8 = 10^{0.9031}$. $240 \div 8$ waxay le'eg tahay $10^{2.3802} \div 10^{0.9031}$. Laakiin, waxaan ognahay in $10^{2.3802} \div 10^{0.9031} = 10^{2.3802-0.9031} = 10^{1.4771}$.

Markaa, waxaan odhan karnaa $240 \div 8 = 10^{1.4771}$. Laakiin, qeexdii Logardamku waxay leedahay mar haddii $(240 \div 8) = 10^{1.4771}$, 1.4771 waa Logardamka $(240 \div 8)$ ama 30. Marka, 30 wuxuu la mid yahay Lidka Logardamka ee 1.4771.

Markaa, 30 waxaan heli karnaa innagoon isku qaybin 240 iyo 8.

Guud ahaan:

Log (m ÷ n) = Log m — Log n.

U fiirso shaqada hoos ku qoran:

Log (240 ÷ 8) = Log 240 — Log 8

Log 240 = 2.3802

—

Log 8 = 0.9031

Log (240 ÷ 8) = 1.4771

∴ 240 ÷ 8 = Lidlog 1.4771

Haddii tusaha lidlogga aad ka eegtid lidlog 1.4771 waxaad heli 30.

∴ 240 ÷ 8

= Lidlog 1.4771

= 30

T u s a a l e:

Isku qaybi 63.15 iyo 425 adoo isticmaalaya Logardam.

$$\text{Log } \frac{63.15}{425} = \text{Log } 63.15 - \text{Log } 425$$

Log 63.15 = 1.8004

Log 425 = 2.6284

Log (63.15 ÷ 425) = 1.1720

63.15 = Lidlog 1.1720

425 = 0.1486

T u s a a l e:

Isku qaybi 91.38 iyo 0.035 adoo isticmaalaya Logardam.

Log (91.38 ÷ 0.035) = Log 91.38 — Log 0.035

$$\text{Log } 91.38 = 1.9608$$

$$- \quad \text{Log } 0.035 = 2.5441$$

$$\text{Log } (91.38 \div 0.035) = \log 3.4167$$

$$= 2611$$

Tusaale:

Haddii Log 2 = 0.3010 Log 5 = 0.6990, raadi

b) Log 2½ t) Log 12½

Furfuris:

b) $\text{Log } 2\frac{1}{2} = \text{Log } \frac{5}{2} = \text{Log } 5 - \text{Log } 2$

$$= 0.6990 - 0.3010 = 0.3980$$

Markaa Log 2½ = 0.3980

t) $\text{Log } 12\frac{1}{2} = \text{Log } \frac{25}{2}$

$$= \text{Log } \left(\frac{5 \times 5}{2}\right) = \text{Log } 5 + \text{Log } 5 - \text{Log } 2$$

$$= 0.6990 + 0.6990 - 0.310$$

$$= 1.3980 - 0.3010$$

$$= 1.0970$$

Markaa Log 12½ = 1.0970

Tusaale:

Fududee adoo isticmaalaya Logardam

$$\frac{8.32 \times 14.76}{38.49}$$

Furfuris:

$$\text{Log } \left\{\frac{8.32 \times 14.76}{38.49}\right\} = \text{Log } 8.32 + \text{Log } 14.76 - \log 38.49$$

Tiro	Log
8.32	0.9201
14.76	1.1691 +
8.32×14.76	2.0892
38.49	1.5853 −
$\frac{8.32 \times 14.76}{38.49}$	0.4939

Log $\frac{8.32 \times 14.76}{38.49}$ = 0.4939

$\frac{8.32 \times 14.76}{38.49}$ = Lidlog 0.4939 = 3.118

Layli:

I. Ka shaqee adoo isticmaalaya Logardam

1) $\frac{715}{324}$

2) $\frac{625}{29.1}$

3) $\frac{4.32}{497}$

4) $\frac{804}{1.73}$

5) $\frac{2.266}{0.022}$

6) $\frac{41.7 \times 1.84}{3.84}$

7) $\frac{47.8 \times 56.83}{43.4 \times 13.2}$

8) $\frac{13.22 \times 1.414}{0.002 \times 31.4}$

9) $\frac{314}{41.2 \times 47.8}$

10) $\frac{24}{44 \times 8.5}$

II. Haddii Log 2 = 0.3010

Log 3 = 0.4771

Log 5 = 0.6991

Log 7 = 0.8451

Raadi adoon isticmaalayn tuse.

1) Log $\frac{35}{3}$

2) Log 13.5

3) Log 17.5

4) Log 0.00105

5) Log 4.2

6) Log $\frac{8.4 \times 1.5}{21}$

7) Log $\frac{12}{5}$

8) Log $\frac{14}{15}$

9) Log $\frac{1}{14}$

10) Log $\frac{3 \times 2}{5}$

III. Buuxi meelaha madhan.

1) Log 2 — Log 3 = (—)

2) Log 4 + Log 5 — Log 2 = Log (—)

3) Log 4 + Log 7 — Log 12 = Log (—)

4) Log 19 — Log 6 + Log 8 = Log (—)

5) Log 33 — (Log 11 + Log 2) = Log (—)

JIBBAARKA IYO XIRIIRKA JIBBAARKA OO LOGARDAM LAGU ISTICMAALAYO

Logardamka 49 waa 1.6902, Logardamka 7 waa 0.8451. Maxaa la dhxeeya Log 49 iyo Log 7? 49 waa 7^2 ama 7×7. Markaa, Log (49) = Log (7×7) = Log 7 + Log 7 = 0.8451 + 0.8451 = 1.6902. Waxan arkaynaa in Log (49) = Log 7^2 = 2 Log 7 = $2 \times 0.8451 = 1.6902$. Bal u fiirso Log 81 iyo Log 3. Log 81 = 1.9085, Log 3 = 0.4771, Log 81 = Log 3^4, bal u fiirso $4 \times 0.4771 = 1.9084$. Ma odhan karnaa Log 81 = Log 3^4 = 4 Log 3? Haa, waayo Log 81 = Log ($3 \times 3 \times 3 \times 3$) = Log 3 + Log 3 + Log 3 + Log 3 = 4 Log 3.

Guud ahaan, haddii lagu weydiiyo Logardamka b waxan odhan karnaa waxay la mid tahay n Log b.

Tusaale:

Raadi Logardamka 2^3, haddii Log 2 = 0.3010

Furfuris:

Log 2^3 = 3 Log 2 = $3 \times 0.3010 = 0.9030$

Tusaale:

Raadi Logardamka 23.47^5

Log 23.47^5 = 5 Logardamka 23.47

= 5×1.3705

= 6.8525

∴ Log 23.45^5 = 6.8525

Tusaale:

Fududee adoo isticmaalaya Logardam, 21.4^7

Furfuris:

Log 21.4^7 = 7 Log 21.4

= 7×1.3304

= 9.3128

21.4^7 = Lidlog 9.3128

= 2,055,000,000

Haddii laguu sheego in Logardamka 64 uu yahay 1.8062, ma heli kartaa Logardamka 8?

Haa, waayo, 8 waxay le'eg tahay $\sqrt{64}$ ama $64^{1/2}$

Marka Log 8 = $64^{1/2}$

$$= \frac{1}{2} \text{ Log } 64$$

$$= \frac{1}{2} \times 1.8062 = 0.9031$$

Tusaale:

Raadi Logardamka $\sqrt[3]{729}$

Furfuris:

$\text{Log } \sqrt[3]{729} = \text{Log } 729^{1/3}$

$= -\frac{1}{3} \text{ Log } 729$

$= -\frac{1}{3} \times 2.8627$

$= 0.95423$

$\text{Log } \sqrt[3]{729} = 0.9542$

Tusaale:

Ka shaqee adoo isticmaalaya Logardam su'aasha hoos ku qoran:

1. $\sqrt[5]{3125}$

Furfuris:

$\text{Log } \sqrt[5]{3125} = \text{Log } (3125)^{1/5}$

$= -\frac{1}{5} \text{ Log } 3125$

$= -\frac{1}{5} \times 3.4950$

$= 0.6990$

$\text{Log } \sqrt[5]{3120} = 0.6990$

$\sqrt[5]{3125} = \text{Lidlog } 0.6990$

$= 5.0000$

Layli:

I. Raadi jibbaarka ama xididka kolba ka lagu weydiiyay

1) $(345)^2$	2) $(6.05)^2$	3) $(1.76)^3$
4) $(3.16)^4$	5) $(1.240)^2$	6) $(1.2)^2$
7) $(1.5)^3$	8) $(3.04)^4$	9) $(44.83)^4$
10) $(.00312)^3$	11) $\sqrt{144}$	12) $\sqrt{1.44}$
13) $\sqrt[4]{6.25}$	14) $\sqrt[3]{0.0125}$	15) $\sqrt[3]{0.0000216}$
16) $(81.81)^5$	17) $(18.8)^{3/2}$	18) $\sqrt{(41.4)^2}$
19) $\sqrt{(0.0021)^5}$	20) $\sqrt[9]{18.47}$	21) $\sqrt[10]{(8400000)^2}$
22) $(\frac{1}{4})^4$	23) $(\frac{1}{2})^5$	24) $\sqrt[2]{(\frac{1}{4})^3}$
25) $\sqrt[2]{(0.0027)^2}$		

II. Haddii Logardamka 729 = 2.8627

Log 625 = 2.7959

Log 1024 = 3.0103,

Raadi Logardamka adoon isticmaalayn tuse:

1. Log 3
2. Log 0.0027
3. Log 8100
4. Log 5
5. Log 125
6. Log 16
7. Log 5120
8. Log 0.002
9. Log .9
10. Log .50

III. Fufudee

1. Log (a.b)
2. Log (a ÷ b)
3. Log a^m
4. Log $a^{m\backslash n}$
5. Log $\sqrt[5]{a}$
6. Log $\sqrt[6]{a^5}$
7. Log (a^m . b^n)
8. Log ($a^x \div b^y$)

Waxa dhici karta in isla su'aal qudha ay ku jiraan isku dhufasho iyo qaybin, jibbaar iyo xidid jibbaar. Bal tusaaleyaashaas hoos ku yaal u fiirso.

Tusaale:

Qiime $7.23 \times \sqrt{\frac{(4.31)^3}{(2.49)^2}}$

Furfuris:

$$\text{Log} \quad 7.23 \times \sqrt{\frac{(4.31)^3}{(2.49)^2}} =$$

$$= \text{Log } 7.23 + \text{Log } \sqrt{\frac{(4.31)^3}{(2.49)^2}}$$

$$= \text{Log } 7.23 + \frac{1}{2} \text{Log } \frac{(4.31)^3}{(2.49)^2}$$

$$= \text{Log } 7.23 + \frac{1}{2} (3 \log 4.31 - 2 \log 2.49)$$

$$= \text{Log } 7.23 + \frac{3}{2} \text{ Log } 4.31 - \log 2.49$$

Tiro	Log
7.23 $\sqrt{(4.31)^3} \quad \frac{3}{2} \times 0.6345$	0.8591 $\frac{1.9035}{2} = 0.9517$
$7.23 \times \sqrt{(4.31)^3}$	1.8108
2.49	0.3962
$7.23 \times \sqrt{\frac{(4.31)^3}{(2.49)^2}}$	1.4146
Log $7.23 \times \sqrt{\frac{(4.31)^3}{(2.49)^2}}$	1.4146
$7.23 \times \sqrt{\frac{(4.31)^3}{(2.49)^2}}$	Lidlog 1.4146

Layli:

Adoo isticmaalaya Logardam, ka shaqee su'aalaha hoos ku qoran:

1. $\sqrt{\frac{1.728}{0.035}}$
2. $\sqrt{\frac{2.73}{27.3}}$
3. $\sqrt{\frac{826}{8.26}}$
4. $21.27 \times \frac{\sqrt{48.36}}{\sqrt[3]{729.}}$
5. $\frac{\sqrt{1.44}}{\sqrt[10]{1.024}} \times 48.4$
6. $41.7^2 \times \sqrt[3]{9.31}$
7. $\frac{(0.413)^3 \times \sqrt{41.2}}{3.12}$
8. $\sqrt{\frac{2.31^2 \times \sqrt[3]{125}}{21.4}}$
9. $(23.4 \times 4.48 \times 5.73) \div 81$
10. $(2.3 \times 0.004) \div (31 \div 0.0000163)$

CUTUB V

TRIGNOOMETERI

Xiddigta innoogu dhawi waxay inoo jirtaa 4.1 sannad ilays (Sannad ilays waa fogaanta islaysku socdo muddo sannad ah iyadoo uu sekenkiiba goynayo 186,000 mayl). Markaa 4.1 sannad ilays wuxuu la mid yahay, haddaynnu kiiloomitir ku sheegno, 38,400,000,000 km. Haddaba sideebaa loo qiyaasay fogaanta intaa le'eg? Waxa lagu soo saaray qaybta xisaabta ee loo yaqaan tirignoometeri. Taas oo ah:

Xaqiiqooyin iyo xeerar ku saabsan xidhiidhka ka dhexeeya saddexagallada dhinacyadooda iyo xaglahooda. Waxa kale oo tirignoometeriga lagu isticmaalaa warshadaha, sahaminta dhulka iyo sayniskaba.

SADDEXAGALLO XAGAL QUMMAN

b. Aragtida Baytagoras

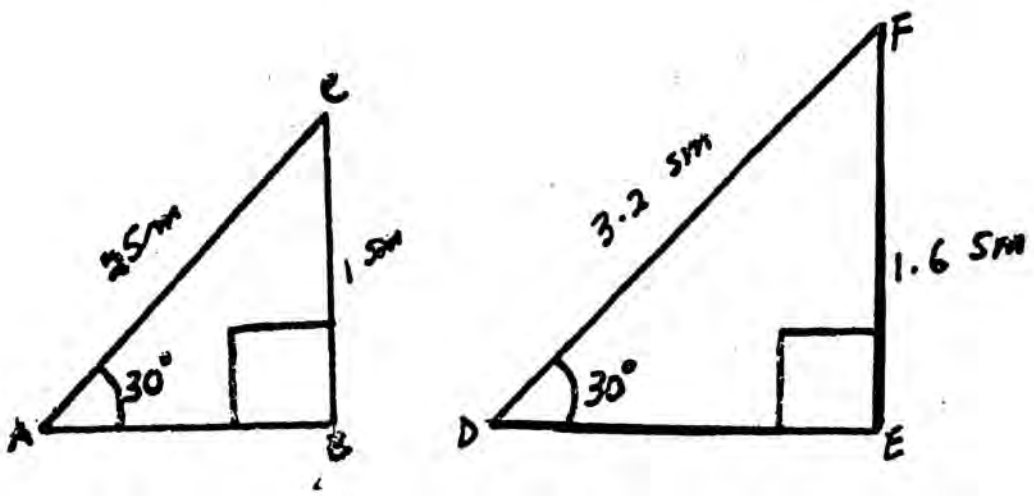
Hore waxaynnu u niqiin in saddexda dhinac ee saddexagalka xagasha qummani ay xidhiidh leeyihiin, taasoo ahayd in shakaalka (dhinaca u dheer) oo laba jibbaarani uu le'eg yahay wadarta labajibbaarrada ee labada dhinac ee kale.

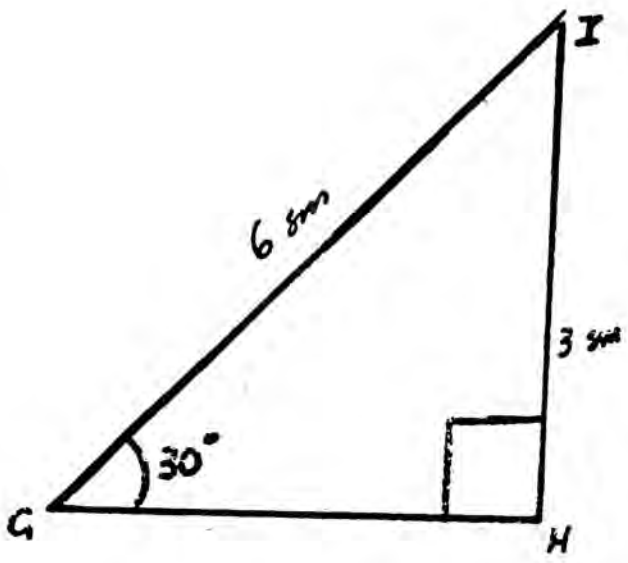
$$s^2 = a^2 + b^2$$

Jidka kor ku qorani wuxuu inoo suurta gelinayaa in aynnu dhinaca maqan raadin karno haddii aynnu haysanno labada dhinac ee kale. Jidkan horeba waynnu ogayn oo waa aragtinkii Baytagoras, ee aynnu jidad kale raadinno.

t. Saamiyada Tirignoometeriga.

Haddii dhawr saddexagal oo xagal qummani ay xagal fiiqan iska le'eg yihiin, markaa waa inay kulli isku qaab noqdaan. Waxana la yidhaahdaa saddexagallo isu eg. Waayo hore aynnu u qaadannay, in haddii laba saddexagal is xaglo le'ekaadaan ay markaa isu eg yihiin. Sidaa daraadeed laba saddexagal xaglo qumman oo kastaa haddii ay isu eg yihiin, saamiyada laba dhinac ee midkood waa inuu le'ekaadaa saamiga dhinacyada kale ee kuwaa la gudboon, sida shaxankan ku muujisan:





$$\frac{BC}{AC} = \frac{FE}{DF} = \frac{IH}{GI}$$

ama $\frac{1}{2} = \frac{1.6}{3.2} = \frac{3}{6}$

$\frac{1}{2} = \frac{1}{2} = \frac{1}{2}$

Waad aragtaa in ay saamiyaashaasu iswada le'eg yihiin. Kulligoodna waa "dhinaca ka soo horjeeda xagasha fiiqan ee 30^0 ah oo loo qaybshay shakaalka".

Xusuus: saddexda dhinac waxaynu had iyo jeer ku kala magacaabaynaa:

1) **Shakaal** = dhinaca ugu dheer ee xagasha qumman ka horjeeda.
2) **Deris** = dhinaca xiga xagasha fiiqan ee lagu siiyo.
3) **Horjeede** = dhinaca xagasha fiiqan ee lagu siiyo ka soo horjeeda.

SAYN:

Haddaba saamiyaasha isle'eg ee aynu kor ku sheegnay waa madoorssomayaal. waxana la yidhaahdaa sayn soo gaabintana (sin).

Q e e x i d :

Sayn: saddexxagal kasta oo xagal qumman saynka xagashiisa fiiqani waa dhinaca xagasha ka soo horjeeda oo loo qaybiyey shakaalka

$$\textbf{sayn} = \frac{\textbf{Horjeede}}{\textbf{Shakaal}}$$

Xagal kastaa waxa u gaar ah sayn aan isbedddelin. Hore waynu u ogayn in Saynka 30^0 uu yahay $\frac{1}{2}$. Haddaba saynka xagal ah 40^0 waxaynu ka helaynaa tusaha buugga ugu dambeeya, wuxuuna noqonayaa 0.6428 oo loo qori:

$$\sin 40^0 = 0.6428$$

KOSAYN:

Isla xagasha 40^0 waxa kale oo ay leedahay saami kale oo madoorsoome ah, waana saamiga laba dhinac oo la isu qaybiyay.

Qeexid:

Saddexagal kasta oo xagal qumman kosayn (cos) xagaashiisa fiiqani waa dhinaca xagasha la derisa oo loo qaybshay shakaalka

$$\cos = \frac{\text{Deris}}{\text{Shakaal}}$$

Matal kosaynka xagasha fiiqan ee 40^0 waa 0.7660 sida tusaha ku taal. Waxana loo qoraa:

$$\cos 40^0 = 0.7660$$

TAANJANT:

Sida saynka ama kosaynka ayaa Taanjantkuna (tan) u yahay saami laba dhinac oo ka mid ah dhinacyada saddexagal xagal qumman.

Qeexid:

Tanjantka xagasha fiiqan ee saddexagal xagal qummani waa dhinaca xagasha ka soo horjeeda oo loo qaybshay dhinaca la deriska ah.

$$\text{Tan} = \frac{\text{Horjeede}}{\text{Deris}}$$

Matalan taanjantka 40^0 waa .08391 sida tusaha ku taal waxana loo qoraa:

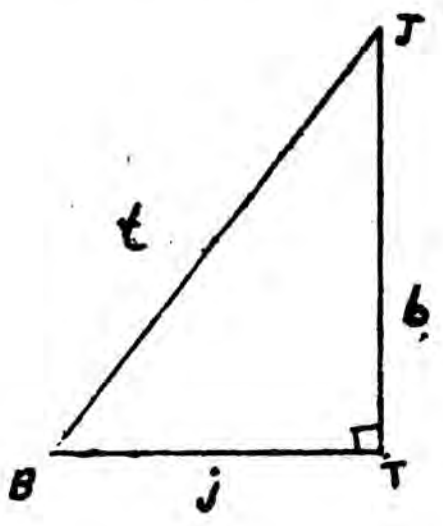
$$\tan 40^0 = .8391$$

Haddaba haddii b, t, j, ay yihiin saddexda dhinac ee saddexagalka hoos ku yaal:

$$\frac{b}{t} = \sin B$$

$$\frac{j}{t} = \cos B$$

$$\frac{b}{j} = \tan B$$



j. Baadidoonka Saamiyada.

Tusaha buugga gadaal kaga yaal waxaynu ka heli karnaa saamiyada saynka, kosaynka iyo taanjantka xaglaha fiiqan ilaa intii ku siman 89 digrii.

Tusaale:

1) Soo saar saynka 27^0.

Furfuris:

Tusaha ka eeg meesha 27^0 ku taallo, dabadeed midigteeda joogutaxa saynka (sin) ka akhri .4540. U qor:

$$\text{Sin } 27^0 = 0.4540$$

2) Baadidoon taanjantka 31^0.

Furfuris:

Markaad hesho meesha 31^0 ay ku taal, 0.6009 ka akhri joogutaxa saddexagal ee "tan" kor kaga qoran tahay. U qor:

$$\text{Tan } 31^0 = .6009$$

3) Baadidoon kosaynka 85^0.

Furfuris:

Raac tallaabooyinkii hore:

$$\text{Cos } 85^0 = 0.0872$$

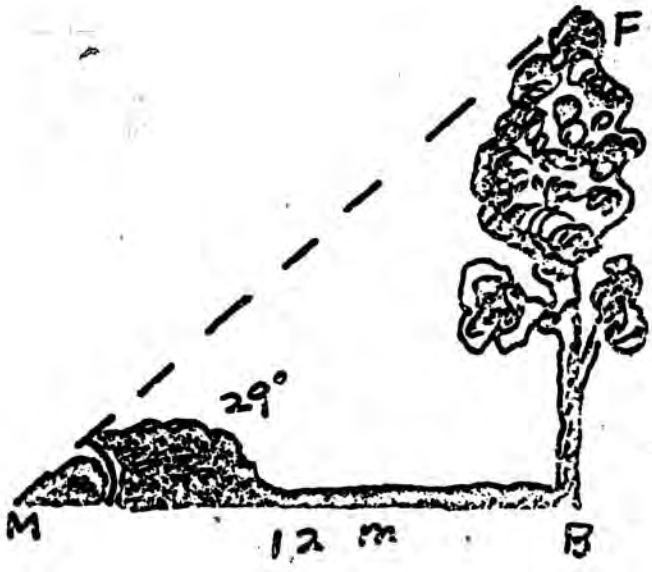
Layli:

Baadidoon saamiyada xaglaha hoos ku qoran, adoo isticmaalaya tusaha.

1. Sin 4^0
2. Cos 46^0
3. Tan 20^0
4. Cos 80^0
5. Sin 60^0
6. Tan 15^0
7. Cos 45^0
8. Sin 45^0
9. Tan 45^0
10. Sin 0^0

KU SHAQAYNTA SAAMIYADA TIRIGNOOMETERIGA

Haddii aynu doonno inaan ogaanno qiyaasta joogga geedkan, j, innagoo taagan meel geedka u jirta 12 mitir. Waxaynu u baahan nahay inaan helno qiyaasta xagasha $\measuredangle$ FMB ee aynu geedka sare ugu eegeyno. Haddaba innagoo isticmaalayna xagal-beeg, haddaynu helno in $\measuredangle$ FMB ay tahay 29^0, waxaynu ogaanaynaa in



$$\frac{j}{12} = \tan 29^0$$

$$j = 12 \times \tan 29^0$$

$$j = 12 \times .5543$$

$$j = 6.6516$$

$$j = 6.7 \text{ m.}$$

6.7 m. waa joogga geedka.

Sidaas oo kale ayaynu balaadhka webigana, u soo saari karnaa. ka dhig inuu balaadhka webigu yahay x mitir.

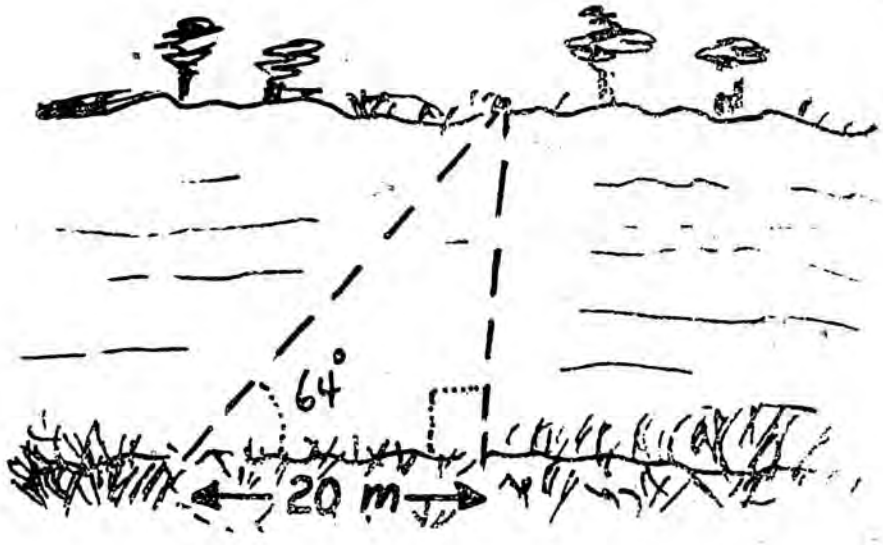
$$\tan 64^0 = \frac{x}{20}$$

$$x = \tan 64^0 \times 20 \text{ m.}$$

$$x = 2.0503 \times 20$$

$$x = 40.10060$$

$$x = 40 \text{ m.}$$



Saamiyada tirignoometerigu had iyo jeer kuma koobna xagal keliya, waayo, saddexagalka xagasha qummani wuxuu leeyahay laba xaglood oo fiiqan. Markaa labaduba waxay leeyihiin saddex saami (sin, cos iyo tan) oo kala duwan. Matalan saddexagalka xaglihiisa fiiqan waa kuwan:

1) $\sin \measuredangle B = \frac{\text{Horjooge}}{\text{Shakaal}} = \frac{3}{5} = 0.6$

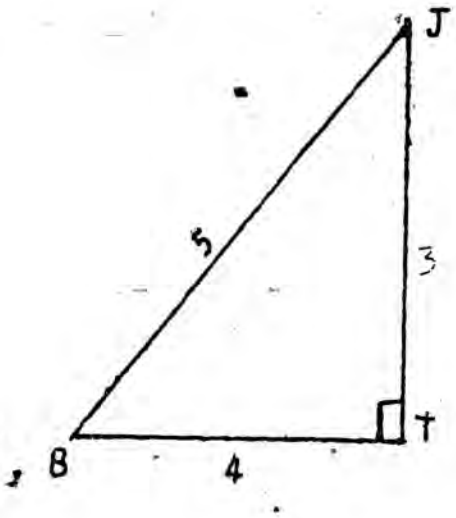
2) $\cos \measuredangle B = \frac{\text{Deris}}{\text{Shakaal}} = \frac{4}{5} = 0.8$

3) $\tan \measuredangle B = \frac{\text{Horjeede}}{\text{Deris}} = \frac{3}{4} = 0.75$

4) $\sin \measuredangle J = \frac{\text{Horjeede}}{\text{Shakaal}} = \frac{4}{5} = .8$

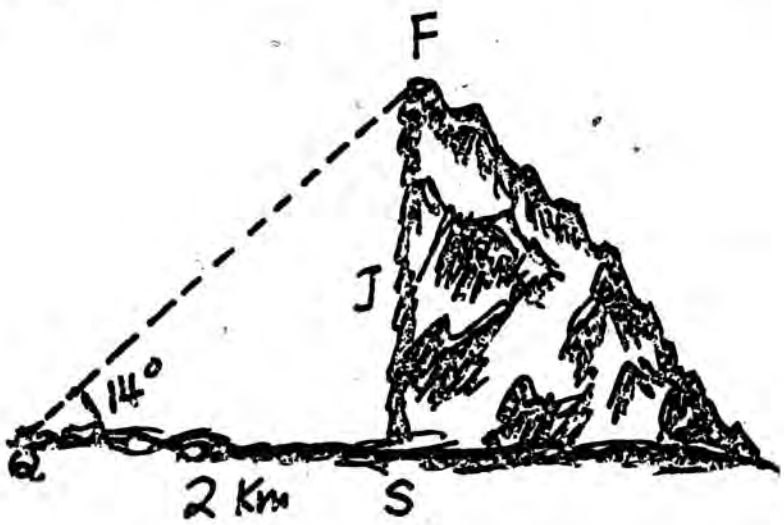
5) $\cos \measuredangle J = \frac{\text{Deris}}{\text{Shakaal}} = \frac{3}{5} = .6$

6) $\tan \measuredangle J = \frac{\text{Horjeede}}{\text{Deris}} = \frac{4}{3} = 1.33$



x. Xaglo Dhacsan iyo xaglo Kacsán.

Qof baa istaagay meel buur dhinaceed u jirta 2 km isagoo doonaya inuu ogaado joogga buurta. Wuxuu markaa ogaaday ∡ SQF in ay tahay 14^0. Sidan ayuu dabeed ku soo saaray joogga j, ee buurta:



$$\tan 14^0 = \frac{\text{j km.}}{\text{2 km.}}$$

$$j = 2 \times \tan 14^0$$

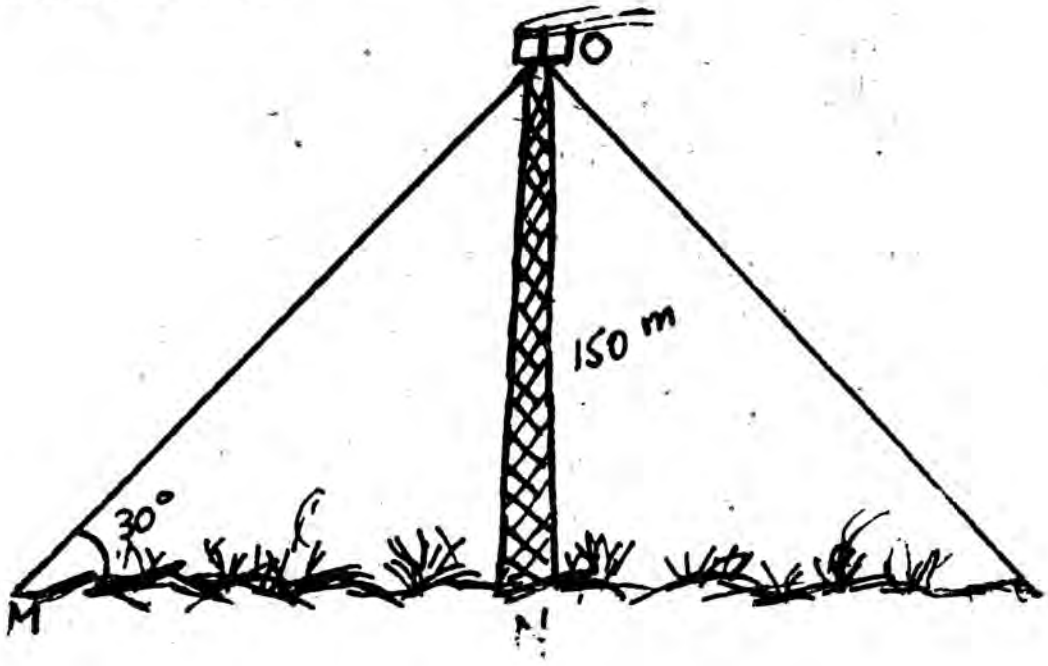
Markaa j km. $= 2 \times .2493$ km.

$= .4986$ km.

$= 498.6$ mitir

ama mitirka ugu dhaw waa 499 m.

Haddaba xagasha SQF ee sare qofku u eegayay waxa la yidhaadhaa xagal kacsan. Haddii, matalan, qofkaasi, uu joogi lahaa buurta figteeda sare, oo uu hoos u soo eegi lahaa halka uu imminka istaagay (2 km. meel u jirta salka buurta), xagasha uu hoos u soo eegi lahaa waxay iyana noqon lahayd 14^0. Waayo QS iyo MF waa laba xarriiqood oo barbarro ah; markaa $\measuredangle$ MFQ iyo $\measuredangle$ FQS waa laba xaglood oo talantaalli ah oo isle'eg (xusuuso astaamihii xarriiqda barbarrada ah iyo wadaajiyaha). Xagasha MFQ ee hoos loo soo eegayana waxa la yidhaahdaa xagal dhacsan.



Tusaale:

Haddii nin Injineerihi uu doonayo inuu taago birta taararka oo dhererkeedu yahay 150 m. uu doonayona inuu dhulka ugu xidho xadhko si xagasha kacsan ee xadhkuhu ay u noqoto 30^0, xadhko intee dherer laale'eg ayuu u baahanayaa?

Furfuris:

Dhererka xadhig waliba wuxuu la mid yahay shakaalka saddexagalka, S. Haddaba:

$$\text{Sin } 30^0 = \frac{150}{S}$$

$$S = \frac{150}{\text{Sin } 30^0}$$

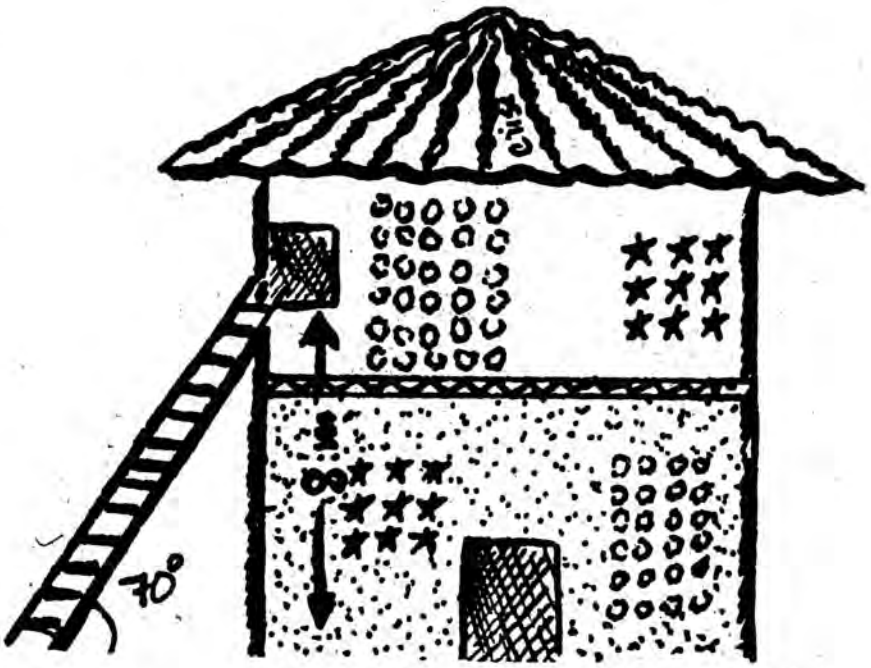
$$= \frac{150}{0.5}$$

$$= 300 \text{ m.}$$

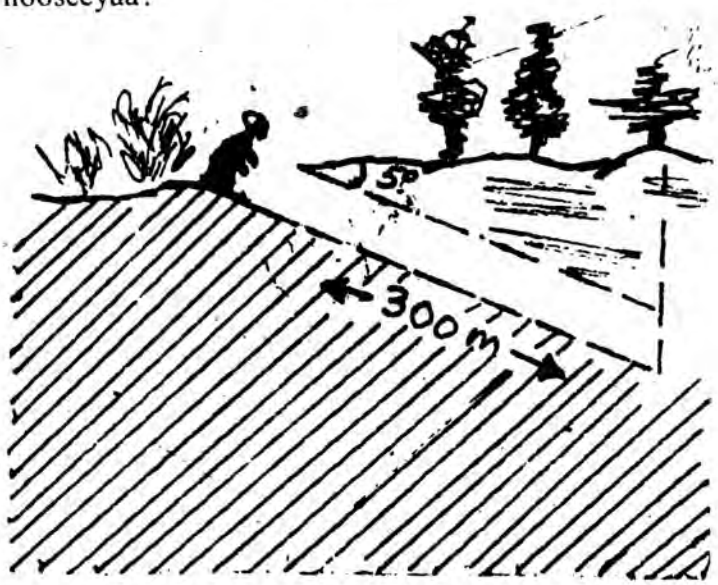
Layli:

Furfur su'aalaha hoos ku qoran.

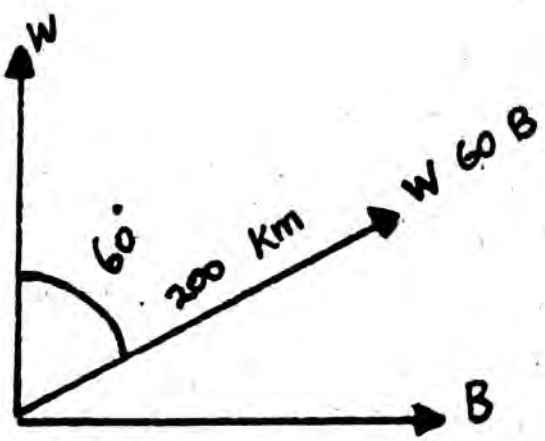
1) Intee ayuu dherer le'ekaanayaa sallaan la doonayo in uu gaadho daaqad (dariishad) dhulka ka sarraysa 8 m. haddii xagasha kacsan ee sallaanku ay tahay 70^0?



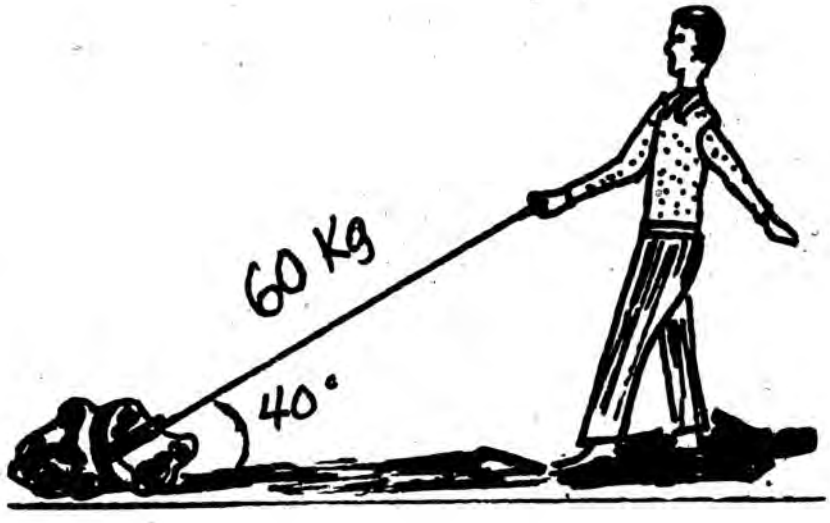
2) Haddii nin macdan-qote ahi uu galo god dhererkiisu yahay 300 m. xagasha uu godka hoos ugu gelayaana ay tahay 5^0, intee in le'eg ayuu markaa ninku ogaada dhulka ka hooseeyaa?



3) Markab baa ka baxay dekad isagoo u jeeda W 60 B (60^0 ayuu bari ka xigaa waqooyiga). Marka uu jihadaa u socdo 200 km. dhinaca bari immisa km. ayuu u socday?



4) Nin baa xadhig ku jiidaya aloobo culus, isagoo isticmaalaya xoog 60 kg ah. Haddii xadhiggu dhulka la sameeyo xagal kacsan oo 40^0 ah, waa immisa xoogga runta ah ee alaabta gudub u jiidayaa; (eeg muujinta).



5) Haddii ged jooggiisu yahay 5 m. fallaadhaha ilayska qorraxduna ay dhulka la sameeyaan xagal dhacsan oo 64^0 ah waa maxay dhererka hadhka geedku?

6) Dayuurad baa dhulka kaga kacday xagal 15^0 ah. Markay xagashaa tooskeeda 1000 m. u socoto, imisa mitir ayay dhulka ka sarreysaa?

CUTUB VI

LAYLI GUUD:
XISAABTA DUGSIYADA DHEXE

Layli: NAQTIIN I

1) Haddii wadarta saddex tiro oo idil ay tahay 678, laba biiro ay yihiin 216 iyo 198, raadi inta ay tahay biirada qarsooni.

2) Asal madoorshaha isygeynta waa maxay? Tiro haddaan eber ka goyno maxaan helnaa?

3) Haddii ardayda dugsigu ay 346 tahay uu arday waliba bixiyo 14 shilin, waa imisa lacagta dugsigu haystaa?

4) Xasan wuxuu hasytaa 29 shilin, Cumarna wuxuu haystaa intaa lix laabkeed. Lacagta uu Cumar haystaa inteebay dheer tahay ta Xasan haysto.

5) 4880 shilin baa loo qaybiyey 16 shaqaale ah. Midkiiba imisuu helay?

6) Qor tirooyinka dhabanka ah ee 10na ka badan, 30na ka yar.

7) Qor tirooyinka kisiga ha ee 40na ka badan, 56na ka yar.

8) Sheeg tirooyinka kuwa dhaban ah, kuwa kisa ah iyo kuwa mutuxan:

   1, 2, 3, 4, 5, 6, 7, 8, 11, 13, 15, 17, 19, 20, 21, 24, 29.

9) Qor tirooyinka mutuxan ee eber ka weyn, soddona ka yar.

10) Tirooyinka soo socda mid walba u dhig sansaanta taranta isirradeeda mutixan:

   i) 28
   ii) 32
   iii) 29
   iv) 65
   v) 80
   vi) 105
   vii) 2196
   viii) 1028
   ix) 582

11) Raadi isirrada ay wadaagaan 72 iyo 64.

12) Qor ururka dhufsaneyaasha ay wadaagaan 12 iyo 18.

13) Raadi I.W.W. lammaanayaashani:

   i) 12; 24
   ii) 36; 18
   iii) 48; 42
   iv) 17; 29
   v) 436; 981
   vi) 4; 5
   vii) 15; 26
   viii) 88; 55
   ix) 48; 54
   x) 63; 28

14) Waa maxay dhufsane u yaraha ay wadaagaan 6 iyo 8.

15) Raadi Dh. Y. W. lammaanayaashani:

   i) 2; 3
   vi) 12; 24

ii) 4; 6

iii) 7; 10

iv) 6; 9

v) 5; 10

vii) 12; 36

viii) 8; 9

ix) 13; 19

x) 1; 2

16) Ka dhig jajab ma qumaneyaal tirooyinka dhafan ee hoos ku qoran:

i) $1\frac{2}{3}$

ii) $3\frac{4}{7}$

iii) $13\frac{21}{22}$

iv) $4\frac{7}{8}$

17) Raadi tirooyinka dhafan ee u dhigma jajab ma qamanayaashan:

i) $\frac{121}{12}$

ii) $\frac{7}{2}$

iii) $\frac{127}{5}$

iv) $\frac{847}{100}$

18) Jajabyadan soo socda mid walba u qor 5 magac oo kale oo u leeyahay:

i) $\frac{1}{2}$ ii) $\frac{2}{3}$ iii) $\frac{12}{5}$ iv) $\frac{6}{90}$ v) $\frac{14}{7}$

19) Waa maxay jajabyo isudhigmaa? Tusaalooyin keen?

20) Raadi tirooyinka weedhahan soo socdaa ay ku rumoobeyaan:

i) $\frac{1}{2} = \frac{?}{4}$

ii) $\frac{8}{4} = \frac{48}{?}$

iii) $\frac{6}{2} = \frac{?}{10}$

iv) $\frac{?}{7} = \frac{24}{42}$

v) $\frac{9}{?} = \frac{81}{18}$

vi) $\frac{?}{15} = \frac{121}{180}$

vii) $\frac{7}{9} = \frac{?}{27}$

viii) $\frac{6}{8} = \frac{15}{?}$

ix) $\frac{12}{15} = \frac{?}{20}$

x) $\frac{9}{6} = \frac{24}{?}$

21) Isugee jajabyadan:

i) $\frac{7}{13} + \frac{1}{13} + \frac{2}{13}$

ii) $\frac{1}{5} + \frac{4}{15}$

iii) $1\frac{2}{3} + 2\frac{3}{5}$

iv) $12\frac{1}{2} + 3\frac{1}{3}$

v) $2\frac{4}{9} + 3\frac{5}{12} + 1\frac{5}{6}$

vi) $(\frac{2}{3} + \frac{1}{5}) + \frac{1}{6}$

vii) $\frac{2}{3} + (\frac{1}{5} + \frac{1}{6})$

viii) $(\frac{2}{3} + \frac{1}{2}) + \frac{3}{4}$

ix) $\frac{2}{3} + (\frac{1}{2} + \frac{3}{4})$

x) $\frac{4}{15} + \frac{1}{5}$

22) Raadi tirooyinka ka maqan weedhahan.

i) $\frac{2}{5} + b = \frac{3}{5}$

ii) $\frac{3}{8} + t = \frac{7}{8}$

iii) $\frac{7}{12} + x = \frac{1}{2}$

iv) $1\frac{1}{2} + d = \frac{7}{4}$

v) $y + \frac{7}{8} = \frac{14}{16}$

23) Kala goo jajabyadan:

i) $2\frac{1}{2} - 1\frac{1}{2}$

ii) $3\frac{3}{4} - 1\frac{1}{4}$

iii) $9\frac{2}{3} - 5\frac{1}{1}$

iv) $15\frac{3}{4} - 6\frac{1}{8}$

v) $5\frac{3}{5} - \frac{33}{10}$

vi) $(1\frac{1}{2} + \frac{3}{4}) - \frac{3}{4}$

vii) $1\frac{7}{24} - \frac{9}{24}$

viii) $\frac{9}{24} - 1\frac{7}{24}$

ix) $(7\frac{2}{3} - 5\frac{1}{4}) - 1\frac{1}{6}$

x) $7\frac{1}{3} - (5\frac{1}{4} - 1\frac{1}{6})$

24) Isku dhufo jajabyadan:

i) $\frac{2}{3} \times \frac{9}{10}$

ii) $3 \times \frac{5}{6}$

iii) $2 \times \frac{1}{2} \times \frac{3}{5}$

iv) $1\frac{1}{2} \times \frac{3}{5}$

v) $\frac{9}{7} \times \frac{7}{3}$

vi) $\frac{5}{6} \times \frac{4}{5} \times \frac{1}{2}$

25) Isu qaybi jajabyadan:

i) $6\frac{1}{8} \div 1\frac{1}{3}$

ii) $12\frac{1}{5} \div \frac{10}{3}$

iii) $12 \div \frac{1}{3}$

iv) $\frac{1}{3} \div 12$

v) $(\frac{3}{3} \div \frac{1}{2}) \div \frac{3}{5}$

vi) $\frac{2}{3} \div (\frac{1}{2} \div \frac{3}{5})$

26) Fududee:

i) $\dfrac{3\frac{1}{2}}{3\frac{1}{4}} \div \dfrac{\frac{3}{5}}{1\frac{5}{2}}$

ii) $\dfrac{3\frac{4}{5} - 1\frac{3}{10}}{2\frac{3}{5} \div \frac{1}{2}} \times \frac{8}{21}$

iii) $3\frac{3}{4} + 4\frac{7}{8} - 6\frac{1}{4} \times 1\frac{1}{3} + \frac{5}{6}$

iv) $\frac{3}{7} - \frac{2}{7} \times 1\frac{1}{2} \times 2$

v) $2\frac{1}{2} - 1\frac{1}{2} \times \frac{3}{2} + \frac{1}{3}$

27) Weelbaa muggiisu yahay $3\frac{3}{4}$ litir. Imisa litir oo kale ayaa buuxin kara haddii ay ku jiraan $1\frac{1}{8}$ litir.

28) Ninbaa siiyey lacagtiisa badhkeed aabbihii. 800 shilin ayaa u soo hadhay. Imisay lacagtiisu ahayd?

29) Jajab walba u dhig sansaanta jajab tobanle.

i) $\frac{7}{10}$

ii) $\frac{8}{100}$

iii) $\frac{19}{10}$

iv) $\frac{4}{10000}$

v) $\frac{16}{1000}$

vi) $\frac{750}{100.000}$

30) Isugee:

i) 0.6 + 3

ii) 6.64 + 8.5

iii) .9 + 13

iv) .141 + 141.

v) 2.374 + 134.2 + 13.42

vi) 1.02 + 1.321 + 141.3

31) Haddii Cumar uu jooggiisu yahay 174 sm., Cabdina jooggiisu yahay 125 sm., imisay kala dheer yihiin?

32) Qolka Xasan bedkiisu waa 18.62 m^2. Qolka Aadanna bedkiisu waa 21.53 m^2. Imisay bededka labada qol is dheer yihiin?

33) Isku dhufo:

i) 1.4 × 1.2

ii) 20 × .8

iii) 1.44 × 2.9

iv) 12.13 × 1.12

v) 0.00713 × 0.3

vi) 713 × 0.003

34) Isu qaybi:

i) 12.6 ÷ 6

ii) 12.6 ÷ 0.6

iii) 0.136 ÷ 0.03

iv) 0.13 ÷ 0.65

v) 0.6 ÷ 7.5

vi) 4.242 ÷ 21

35) U rog tirooyinka tirada idil ee ugu dhow:

i) 3.8
ii) 45.63
iii) 132.453
iv) 46.7
v) 59.8
vi) 15.879

36) Arday baa xaashi dhererkeedu yahay 7.93 sm. u kala gooyay saddex jeex oo isle'eg. Jeexiiba waa imisa dhererkiisu?

37) baabuur baa la saaray 20 foosto oo mid walba culayskeedu yahay 142.212 Kg. waa imisa culayska baabuurka la saaray?

38) Wiil baa xoolihiisii badhkood hooyadii siiyay. Intii soo hadhay marka saddex meelood loo qaybiyo meel ahaan wuxuu siiyay aabbihii. Waxa u soo hadhay 800 shilin. Imisuu markii hore haystay.

39) Nijaar ayaa qori dhererkiisu yahay 17.64 sm. u kala gooyay 7 meelood oo isle'eg. Waa imisa dhererka qayb walba?

40) Faadumaa soo gadday 4.25 Kg. oo bariis ah iyo 1.75 Kg. oo hilib ah. Waa imisa lacagta ka baxday Faadumo haddii 1 Kg. oo bariis ahi yahay 2.35 shilin, 1 Kg. hilib ahina uu yahay 3.75?

41) Raadi qiimaha:

i) 5 hg. 7 dg. + 8 kg. 7 hg. 6 g. — 6 hg. 2 dg. 5g.
ii) (5 dg. 7 g. 2 g. 2 dg.) × 5
iii) (5 Kg. 3 hg. 4 dg. 6 g.) ÷ 6

42) Raadi qiimaha:

i) 3 km. 4 m. 3 dm. 2 cm. + 9 km. 7 m. 4 dm. 2 sm.
ii) (3 km. 5 dm. 4 m. 2 sm.) × 9
iii) (7 km. 6 hm. 5 dm. 4 sm. 5 mm.) ÷ 5

43) Imisa kumi baa ku jira 2 shilin?

" taano " 3 gini?
" gini " 60 shilin?
" shilin " 2 gini 4 shilin 6 kumi?
" senti " 2 shilin 4 kumi?

44) Haddii derbi uu ka kooban yahay 35 saf oo leben ah, halkii lebenna jooggiisu yahay 7.6 sm, imisuu noqonayaa joogga derbigu mitir ahaan?

45) Raadi:

i) 2 maal. 3 saac. 43 miridh + 13 maal. + 23 saac. + 33 midhidh
ii) (3 sano 180 maalmood 20 saac.) × 5
iii) (6 sano 350 maalmood) ÷ 6
iv) 2 maalmood 13 saac. — 2 maalin 20 saac.
v) (3 saac. 41 miridh 8 sekan) ÷ 4

46) Ka dhig boqolley jajabka hoos ku yaal.

i) $\frac{1}{4}$ iv) $\frac{1}{5}$

ii) $\frac{1}{2}$ v) $1\frac{1}{5}$

iii) $\frac{1}{8}$ vi) $\frac{7}{5}$

47) Ka dhig boqolley jajab tobanlaha hoos ku qoran.

i) 0.52 iv) 0.07

ii) 1.52 v) 0.7

iii) 0.032 iv) 1.9

48) U rog tobanle boqolleyda hoos ku qoran:

i) 7% iv) 65%

ii) 25% v) 0.1%

iii) 175% vi) 0.32%

49) Ka dhig jajàb boqolleyda hoos ku taal.

i) 50% iv) 12.5%

ii) 75% v) $33\frac{1}{3}$ %

iii) 125% vi) 35%

50) Axmed baa seylada geeyey 240 midh oo ûkun ah. 75% buu gaday. Imisa hal buu gaday? Boqolkiiba intee hadhsan?

51) Jaamac buu miisaankiisu noqday 60 Kg. markii uu bukooday. Waxa ka dhacay 20% miisaankiisii. Imisuu ahaa miisaankiisu markii hore?

52) Fasal bay 6 gabdhood ku jiraan. Fasalkaa 80% waa wiilal. Waa imisa wiilalka fasalka ku jiraa? Imisa arday baa fasalka dhigta?

53) Nin macdaarra ah ayaa 20 shaadh midkiiba ku iibiyey 25 shilin. Wuxuu ka macaashay 25%. Imisuu shaadhkiiba soo siistay?

54) 4 dugsi baa waxa ku kala jira 254, 320, 300 iyo 290 arday. Raadi tirada celceshan ee ardayda ku jirta dugsigiiba.

55) Baabuur baa Xamar iyo Jowhar oo 90 km. isku jira 4.5 saacadood u kala socday. Raadi xawaaraha celceliska ah ee baabuurkaas?

56) Afar wiil baa jooggooda celceliska ahi uu ahaa 1.7 m. Cali oo jooggiisu yahay 1.2 m. ayaa ku soo kordhay. Waa imisa joogga celceliska ah ee 5ta wiil?

57) 24 arday baa da'dooda celceliska ahi ay tahay 19 sannadood. Xasan markuu ku soo biiray da'dooda celceliska ahi waa 19.2 sannadood. Xasan waa imisa jir?

58) Baabuur baa xawaarihiisa celceliska ahi uu ahaa 25 mayl/saacad muddo 10 saacadood ah. 4ta saacadood ee hore waa 30 mayl/saacad. 6da saacadood ee dambe, waa imisa xawaaraha baabuurku?

59) Waddan baa kulkiisa celceliska ah ee lixda bilood ee hore uu yahay 20^0 sentigireyd, bishiiba, kulka celceliska ah ee lixda bilood ee dambana uu yahay 30^0 sentigireyd bishiiba. Waa imisa kulka celceliska ah ee bishiiba haddii sannadka oo dhan la isku qaado?

60) Raadi laba jibbaarrada tirooyinkan:

i) 25

ii) $7\frac{1}{4}$

iii) 1.25

iv) 12.1

v) 0.0003

vi) 0.012

61) Soo saar xididka laba jibbaarka tirooyinka, adigoo isticmaalaya isireyn.

i) 169

ii) 629

iii) 6561

iv) 14641

v) 12321

vi) 5625

62) i) Waa maxay labajibbaarane?

ii) Waa maxay laydi?

iii) Sheeg wuxuu yahay saddexagal?

63) Sheeg jidka lagu helo wareegga labajibbaaranaha:

" " " " " laydiga.

" " " " bedka labajibbaaranaha.

" " " " " laydiga.

" " " " " saddexagal.

64) Raadi wareegga labajibbaaranaha dhererka dhinacyadiisu ay yihiin 4.14 sm.

65) Raadi wareegga laydiga dhererkiisu yahay 2 m. 9 mm. balaadhkiisuna yahay 1 m. 7 dm. 4 sm.

66) Waa imisa dhererka dhinaca labajibbaaranuhu haddii wareeggiisu yahay 104 sm.

67) Waa imisa dhererka laydigu haddii balaadhkiisu yahay 21 sm. wareggiisuna 90 sm.

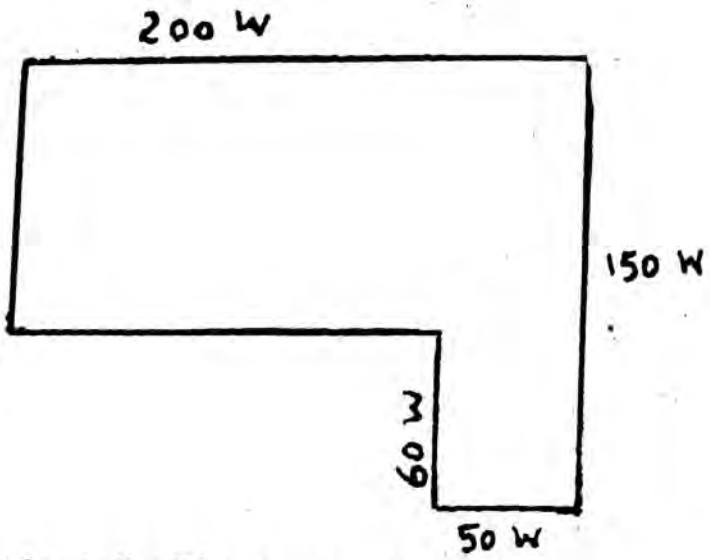
68) Raadi balaadhka beerta wareeggeedu yahay 3.6 km. dhererkeeduna 1.7 km.

69) Waa imisa wareegga saddexagal dhinacyadiisu yihiin 1 m. 20 sm., 2 m. 90 sm., 1 m. 7 mm.

70) Waa imisa wareegga laydiga dhererkiisu yahay 1 mitir balaadhkiisuna 9 sm.

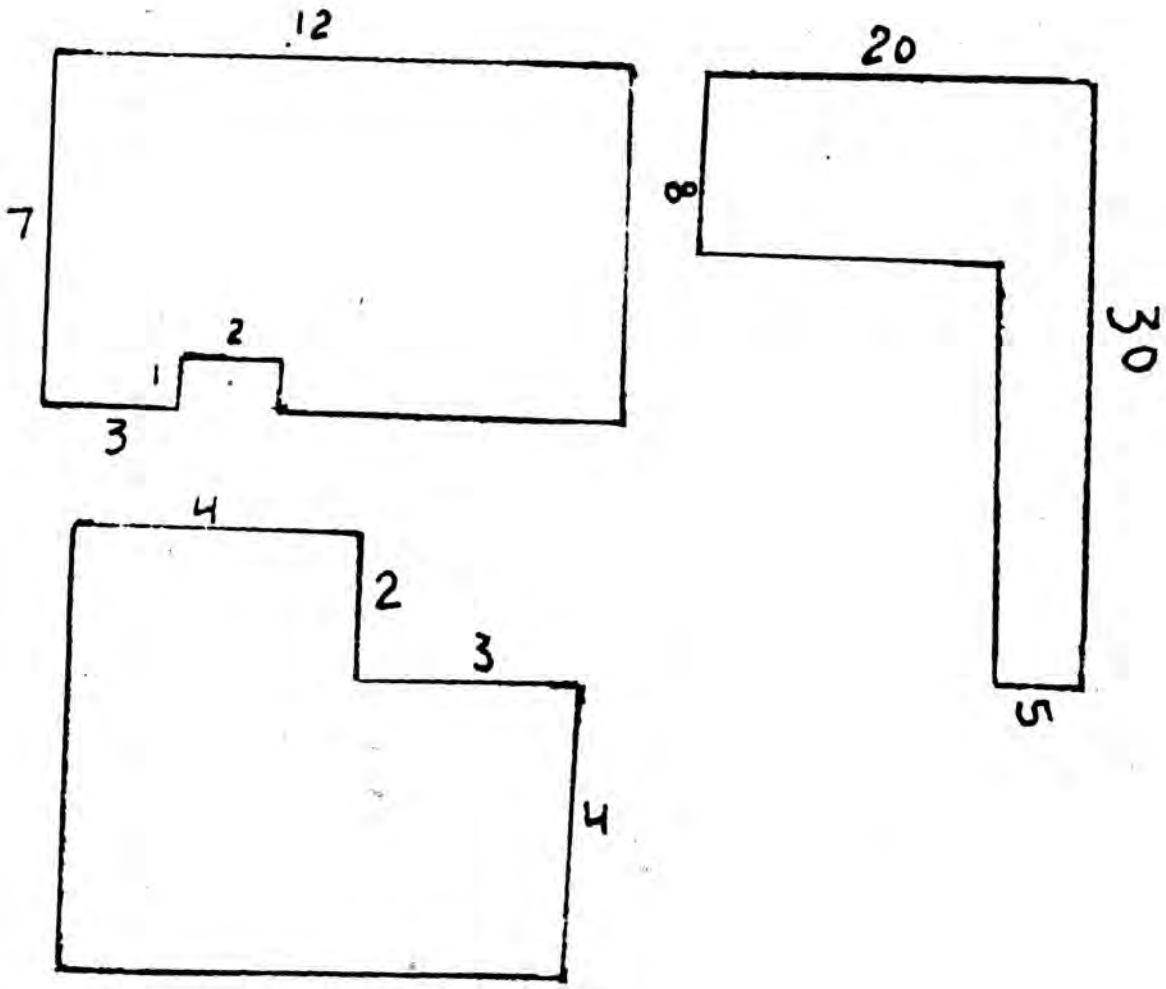
71) Waa imisa bedka dermo dhererkeedu yahay 2 m. 3 sm. balaadhkeeduna yahay 1 m? Jawaabta ku sheeg sm^2.

72) Ku raadi waar labajibbaaran, bedka beerta hoos ku taswiiran.



73) Harqad miis baa ballaadhkeedu yahay 1.6 m dhererkeeduna yahay 2.15 m. Waa imisa bedkeedu haddii lagu doono (b) mitir labajibbaaran (t) sentimitir labajibbaaran.

74) Raadi bededka hoos ku taswiiran.



75) Raadi bedka saddexagal salkiisu yahay 70 m. jooggiisuna 21 m.?

76) Waa imisa bedka saddexagal jooggiisa iyo salkiisu ay kala yihiin 2 m. 6 dm. iyo 1 m. 4 dm. 6 sm. siday u kala horreeyaan.

77) Sheeg salka saddexagal bedkiisu yahay 124 m^2. jooggiisuna yahay 8 m.

78) U beddel litiro, desilitiro, sentilitiro iyo milimitiro:

i) 51. 4 sl.
ii) 2 kl.
iii) 1.25 l.
iv) 130 ml.
v) 140 sl.
vi) 16 l. 2 ml.

79) Kiilolitirka biyaha ahi waa imisa sentimitir?

80) U rog litiro:

i) 2 galaan
ii) 3 gl. 2 k. 2 b.
iii) 8 gl. 3 K. 1 b.

Layli: NAQTIIN II

1) Sheeg weedhahan soo socda astaamaha isku dhufashada ama isugeynta tirooyinka ay waafajisan yihiin.

i) $(8 + 3) + 12 = 8 + (3 + 12)$
ii) $(8 + 3) + 12 = 12 + (8 + 3)$
iii) $(3 + 6) + (11 + 7) = (11 + 7) + (3 + 6)$
iv) $5 \times (15 \times 4) = (5 \times 15) \times 4$
v) $36 \times (2 \times 4) = (2 \times 4) \times 36$
vi) $(3 \times 5) \times (6 \times 2) = (6 \times 2) \times (3 \times 5)$

2) Dhammee weedhahan soo socda si ay u tusaan kala dhig.

i) $3 \times (7 + 2) = \square$
ii) $4 \times (6 + 5) = \Delta$
iii) $(4 + 8) \times 7 = \Delta$
iv) $(5 + 19) \times 22 = \Delta$

3) Xarriiqda tirada ku muuji in:

i) $3 \times (5 + 3) = (3 \times 5) + (3 \times 3)$
ii) $7 + (6 + 11) = (7 + 6) + 11$
iii) $12 \times (4 + 2) = (12 \times 4) + (12 \times 2)$
iv) $(8 \times 4) \times 2 = 8 \times (4 \times 2)$

4) Waxaad ku muujisaa xarriiqda tirada xeerka (b) kala hormarinta isugeynta (t) kala hormarinta isku dhufashada (j) hormagelinta isugeynta (x) kala dhigga isku dhufashada.

5) Xarriiqda tirada waxaad ku muujisaa:

i) $b > 4$ iv) $6 < k < 8$

ii) $t < -3$ v) $-2 < k < 2$

iii) $j \geq 7$ vi) $-3 < k < 3$

6) Adoo isticmaalaya astooyinka dheelliga hadba tii habboon, waxaad qortaa:

i) b way ka weyn tahay x.

ii) t waxay ka weyn tahay — 2 waxayna ka yar tahay 5.

iii) d waxay ka yar tahay ama le'eg tahay eber waxayna ka weyn tahay — 6.

iv) g waxay u dhexeysaa m iyo n.

7) Adoo raacaya habka qaybiska iyo celcelinta, waxaad soo saartaa xidida labajibbaarka.

i) 529 iv) 169

ii) 368 v) 2128

iii) 40 vi) 19.74

8) Waa imisa dhinaca labajibbaarka uu bedkiisu yahay 640 m^2.

9) Soo saar xididka labajibbaarka:

i) 0.000169 iii) 0.7634

ii) 21.48 iv) 0.08481

10) Warfaa aqal buu ku iibiyey 17,634 shilin. Markii uu bixiyey 150 shilin oo dillaal ah haddii uu helay 300 shilin oo macaash ah, imisuu aqalku ku joogay?

11) Nin baa alaabo soo siistay 480 shilin kuna iibiyey 420 shilin. Boqolkiiba imisuu ku khasaaray?

12) Saacad lagu iibiyey 250 [illegible]lin ayaa laga macaashay boqolkiiba 5 shilin. Qiimaha gadashada saacaddu im[illegible]ahaa?

13) 25 juunyadood oo mid [illegible]a la siistay 300 shilin ayaa laga macaashay boqolkiiba sagaal shilin. 3 juunyad[illegible] way qoyeen. Intii hadhay middiiba 310 shilin ayaa lagu gaday. Imisaa boqolkiiba laga macaashay?

14) Magaalo ayaa dadka ku nooli ay yihiin 500,000. Haddii sannadkiiba ay ku korodho 4%, laba sannadood dabadeed intee ku nool magaalada?

15) Kabo la soo siistay 90 shilin ayaa markay iibsami waayeen lagu gaday 81 shilin. Boqolkiiba imisaa lagu khasaaray?

16) Haddii 600 shilin la dhigtay Banki bixinaaya sannadkii dulsaar ah 3% oo lacagtuna tiillay bankiga muddo 3 sannadood ah, soo saar dheefta fudud.

17) 200 shilin ayaa la dhigtay banki bixiya dulsaar ah 3% sannadkii. Laba sannadood dabadeed ayaa laga qaatay 800 shilin. 5 sannadood dheefta laga helayaa waa imisa?

18) 600 shilin oo qof la amaahiyey 5 sannadood ayaa keentay hanti ah 690 shilin. Boqolkiiba dulsaarku waa intee?

19) Lacag baan dhigtay banki bixinaaya dulsaar ah 4% sannadkii. Markii 5 sannadood lacagtii ii tiillay bankiga hantidaydii waxay noqotay 3600 shilin. Soo saar inta aan dhigtay?

20) Cali baa banki bixiya dulsaar ah 4% sannadkii, 700 shilin dhigtay. Imisa sannadood dabadeed bay hantida Cali noqonaysaa 770 shilin?

21) Raadi dheef korka laga helayo 200 shilin oo muddo 3 sannadood taallay banki bixiya 5% sannadkii.

22) Waa imisa dheef korka laga heli karo lacag 3560 shilin, oo taallay muddo $2\frac{1}{2}$ sannadood ah banki dulsaarkiisu yahay 2% sannadkii.

23) Raadi hantida iyo dheef korka laga helay:

b) 600 shilin muddo 3 sannadood ah haddii dulsaarku uu ahaa 4% sannadkii.

t) 604.70 shilin muddo $1\frac{1}{2}$ sannadood ah haddii dulsaarku uu ahaa 5% sannadkii.

j) 600 shilin muddo 3 sannadood ah haddii dulsaarku yahay $2\frac{1}{4}$% sannadkii.

x) 1105.70 shilin muddo 2 sannadood ah haddii dulsaarku yahay $3\frac{1}{4}$% sannadkii.

24) Intey is dheer yihiin dheefta fudud iyo dheef korka laga helay:

b) 385 shilin muddo 3 sannadood ah haddii dulsaarku yahay 4% sannadkii.

t) 1045 shilin muddo $2\frac{1}{2}$ sannadood ah haddii dulsaarku yahay 5% sannadkii.

j) 246 shilin muddo $3\frac{1}{2}$ sannadood ah haddii dulsaarku yahay $2\frac{1}{2}$% sannadkii.

25) Isticmaal xeerka dheef korka.

b) raadi hantida haddii 300 shilin uu dulsaarkoodu yahay 5% sannadkii muddo 2 sannadood ah.

t) raadi hantida haddii 650 shilin uu dulsaarkeedu yahay $4\frac{1}{2}$% sannadkii muddo 2 sannadood ah.

j) 580 shilin uu dulsaarkoodu yahay 3% sannadkii muddo 3 sannadood ah.

26) U rog sal shan:

i) 6
ii) 5
iii) 25
iv) 104
v) 173
vi) 273

27) U rog sal laba:

i) 9
ii) 17
iii) 19
vi) 63
v) 89
vi) 147

28) U rog sal toban iyo laba:

i) 13
ii) 12
iii) 144
iv) 207
v) 576
vi) 2174

29) U rog sal toban:

i) $(10101)_2$
ii) $(1000)_2$
iii) $(100111)_2$
iv) $(101)_2$
v) $(111)_2$
vi) $(1101)_2$

30) U rog sal toban:

i) $(4033)_5$
ii) $(4001)_5$
iii) $(204)_5$
iv) $(3124)_5$
v) $(1004)_5$
vi) $(131)_5$

31) Haddii t = toban, k = toban iyo kow, u rog sal toban:

i) $(t3kl)_{12}$
ii) $(943)_{12}$
iii) $(109)_{12}$
iv) $(281)_{12}$
v) $(346)_{12}$
vi) $(149)_{12}$

32) Soo saar wadartooda:

i) $(101)_2 + (1001)_2 + (111)_2$
ii) $(4321)_2 + (444)_2 + (3012)_2$
iii) $(tk19)_2 + (988)_2 + (k97)_2$

33) Tiro qudha ka dhig:

i) $(39t4)_{12} - (2kt5)_{12}$
ii) $(430)_5 + (213)_5 - (304)_5$
iii) $(1101)_2 - (1011)_2$
iv) $(tk9t)_{12} - (901)_{12}$

34) Isku dhufo:

i) $(101)_2 \times (11)_2$
ii) $(1001)_2 \times (101)_2$
iii) $(4234)_5 \times (12)_5$
iv) $(1204)_5 \times (102)_5$
v) $(t90k)_{12} \times (97)_{12}$
vi) $(ktkk)_{12} \times (19)_{12}$

35) Baabuur baa sacaddii jara 60 km. Fogaan intee le'eg buu goynayaa $12\frac{1}{2}$ saacadood?

36) Baabuur ayaa $2\frac{1}{4}$ saacadood u kala socday Xamar iyo Jowhar oo 90 km. isu jira. Waa imisa xawaaraha baabuurkaasi?

37) Imisa saacadood ayuu ku qaadanayaa baabuurka xawaarihiisu yahay 20 mayl sacaddiiba, inuu ku gaaro meel 76 mayl jirta?

38) Faras baa magaalo jirta 50 Km. ku gaadhay 2 saacadood, faras kalena magaaladii wuxuu ku gaadhay $2\frac{1}{2}$ saacadood. Labada faras xawaarahoodu intey is dheer yihiin?

39) Banki baa dadka lacag dhigtay muddo toddobaad ah ay ahaayeen:

Sabti	Axad	Isniin	Salaasa	Arbaca	Khamiis	Jimce
12	2	7	6	4	5	0

Ku muuji "garaaf" jiitimeed.

40) Magaalo ayaa roobkii helay sannadkii hore uu ahaa:

Jan.	Feb.	Maarso	Abriil	Mey	Juun	Luulyo
110"	12"	18"	24"	28"	30"	26"

Agoosto	Sebt.	Oktoober	Nofembar	Diisambar
24"	21"	18"	11"	8"

Ku muuji "garaaf" xarriiqeed.

41) Wasaaradda Waxbarashada lacagteeda siday u bixisay baa hoos ku taal: 40% mushaharo, 25% buugag, 10% cuntada dugsiyada hoyga, 15% xafiisyadeed, 5% dugiyada hagaajintooda, 5% waxyaabo kale. Ku muuji "garaaf" goobo.

42) Ku muuji habka kullammada laydi:

i)

A	−4	−3	−2	−1		0	1	2	3	4
B	3	2	1	0		−1	−2	−3	−4	−5

ii) (1, 2), (2, 4), (3, 6), (4, 8), (5, 10), (6, 12), (7, 14).

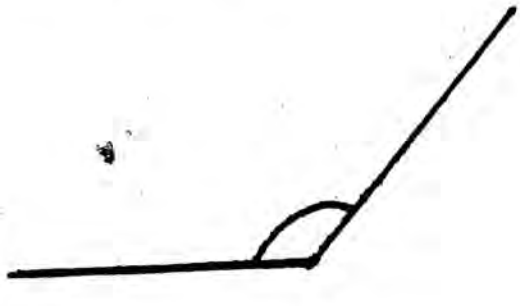
iii) (1, 5), (2, 9), (3, 13), (4, 17), (5, 21),

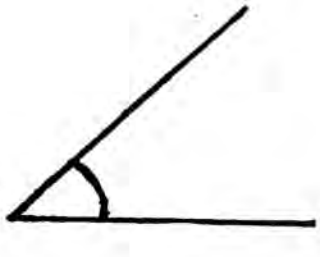
iv) (3, 3), (−4, 3), (4, 5), (6, 7), (8, 7).

43) Lammaane xaglo ah oo deris ahi ma noqon karaan lammaane xaglo ah oo foodsaar ah?

44) i) Cabbir xaglahan:

ii) Guuri xaglaha.





45) Waa maxay:

i) Xaglo food saar ah.

ii) Xagal qumman.

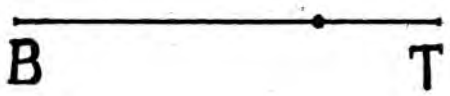
iii) Xagal dacsan.

iv) Xaglo deris ah.

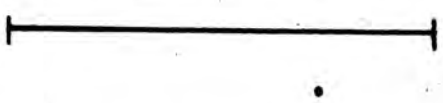
46) i) Samee xarriijin 6 sm. Dabadeedna kala badh.

ii) Samee xarriijin 4 hiish ah. Dabadeedna kala badh.

47) Qotomaha xarriijinta ee barta calaamadaysan maraya sawir.



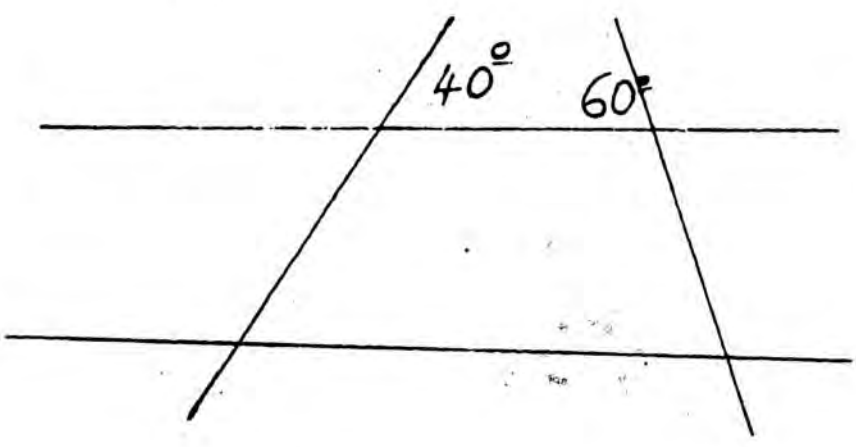
48) Qotomaha xarriijinta hoos ku taal ee barta dibadda ku taal maraya sawir.



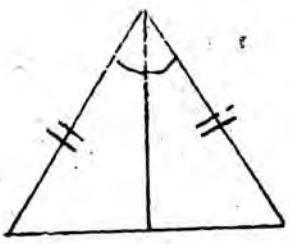
49) i) Sawir xagal 45^0 ah adoo isticmaalaya goobeeye iyo mastarad.

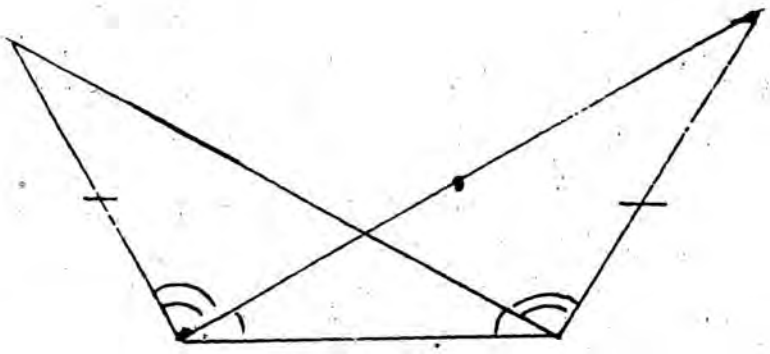
ii) Sawir xagal $22\frac{1^0}{2}$ ah adoo isticmaalaya goobeeye iyo mastarad.

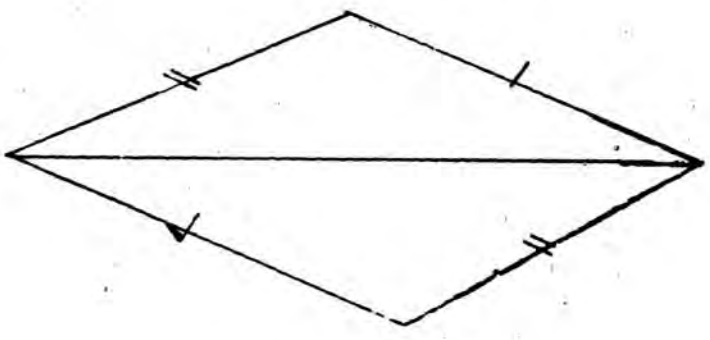
50) Xaglaha aan cabbirkoda lagu siin raadi.



51) Jaantusyadan hoos ku yaal, saddexagallada wada socdaa ma isku sargo'an yihiin? Hadday haa tahay sheeg sababta:







52) BTJX waa laydi: BT = 17 sm. TJ = 8 sm. Waa intee xaglagooyaha TX?

53) KLMN waa laydi. KL = 12 sm. KM = 13 sm. Raadi KN?

54) Sallaan ku tirsan daaqad 8 m. dhulka ka sarreysa ayaa guntiisu u jirtaa 15 sm. gidaarka. Waa intee dhererka sallaanku?

55) Waa maxay:

i) Saddexagal xagal fiiq ah

ii) " qumman.

iii) " xagal furan.

iv) " labaale ah.

v) " siman.

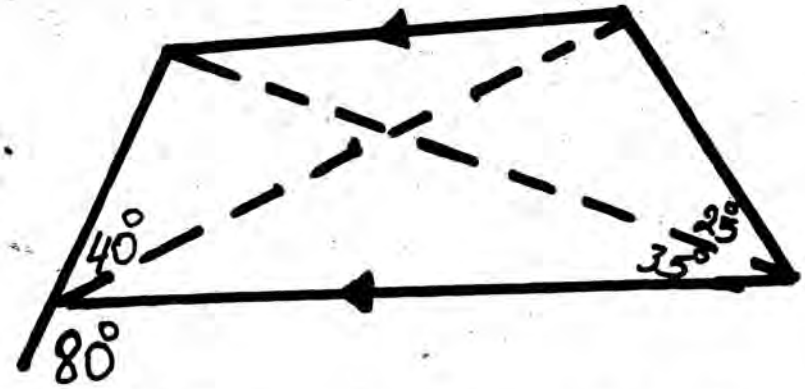
56) Adigoo goobeeye iyo mastarad isticmaalaya samee:

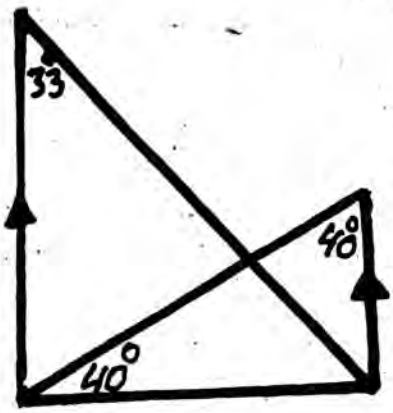
i) Xagal 60^0

ii) Saddexagal siman.

57) Waa imisa xagal dibaddeeda saddexagal siman?

58) Soo saar xaglaha maqan:





59) Samee labajibbaarane dhiniciisu yahay 3 sm.

60) i) Waa imisa cabbiraad xagal gudeed kasta ee toddoba-geesle hufan?

ii) Waa imisa cabbiraadda xagal gudeed kasta 5 geesle hufan?

iii) Waa imisa cabbiraadda xagal gudeed kasta ee 10 geesle hufan?

iv) Waa imisa cabbiraadda xagal gudeed kasta ee 12 geesle hufan?

61) Raadi meeriska goobada gacankeedu yahay $3\frac{1}{2}$ sm.

62) Haddii gacanka shaagga baaskiilka Cabdullaahi uu yahay 42 hiish, intee fuudh buu socday marka uu shaaggu wareegay 10 goor.

63) Soo saar bedka goobada gacankeedu yahay 14 sm.

64) Raadi bedka goobada meeriskeedu yahay 220 m.

65) Soo saar bedka goobada dhexroorkeedu yahay 7 sm.

66) Raadi gacanka goobada bedkeedu yahay 420 m^2.

67) Raadi gacanka goobada bedkeedu yahay 1386 sm^2.

68) Raadi meeriska goobada bedkeedu yahay 616 $fuudh^2$.

69) Berkad, bedka salkeedu yahay 169 m^2., jooggeeduna yahay 9 m. ayaa biyo ka buuxda. Waa imisa mugga biyaha berkadda ku jiraa?

70) i) Raadi mugga laydi malaasan oo cabbirka dhinacyadiisu yihiin 12 sm., 8 sm. iyo 3 sm.

ii) Sheeg jidka lagu helo mugga afar geesle malaasan.

71) i) Sheeg jidka lagu helo mugga dhululubo.

ii) Dhululubaa gacanka salkeedu yahay 4 m., jooggeeduna yahay 7 m. Raadi mugga dhululubadaa.

72) Haddii dhululubo dhererkeedu yahay 14 sm. muggeeduna yahay 704 sm^3. waa ee gacankeedu?

73) Soo saar B.

i) $B : 4 = 9 : 2$

ii) $6 : 4 = 9 : B$

iii) $1\frac{1}{2} : B = 1 : 3$

Layli: NAQTIIN III

1) Qor weedh tiro oo (b) run ah (t) been ah.
2) Waa maxay weedh furani?
3) Kala sheeg weedh furan iyo odhaah.
4) Sheeg urur rumeedka weedhahan furan:
   b) $6x + 3 = 27$
   t) $2x - 3 = 15$
   j) Isagu waa Madaxweyne ku xigeenka J.D.S.
   x) $2 + x = 0$.
5) Doorsoome iyo madoorsoome maxay kala yihiin?
6) Weedhan raadi urur rumeedkeeda adigoo la kaashanaya horaadka lagu siiyey.

b) $3x + 5 = 11$	D = { 1, 2, 3, ... 20 }
t) $4x + 5 - 6$	D = Tiro lakab.
j) $\frac{4}{x} = 7$	D = Abyooneyaal.
x) $3x + 5 = 17$	D = { 1, 2, 3, ... 10 }
kh) $4x = 5$	D = Tiro idil.

7) Goormay laba isle'eg isudhigmaan.
8) Lammaanayaashan isle'egyada ah kuwee baa isudhigma.

b) $7x + 2x = 13$	iyo	$4x - 1 = 11$
t) $4x + 5 = 6$	"	$7x + 7 = 18$
j) $2x - 30 = ?$	"	$x + 7 = 22$
x) $\frac{3x}{2} = 6$	"	$5x + 19 = 39$
kh) $x + 3 = 7$	"	$x - 3 = 5$

9) Kala sheeg weedh tiro iyo weedh furan.
   Ma dhici kartaa in weedh xisaabeed furan la helo? Keen tusaale.
10) Sheeg dhowr lammaane horsan oo run ka dhiga isle'egta: $2x + 3y = 7$.
11) Dhammaystir lammaaneyaashan horsan si ay uga mid noqdaan urur rumeedka $3x + 2y = 40$.
   (1,), (, 5), (, 17), (5,), (, 9).
12) Furfur isle'egyadan wadajira:
   b) $10x + 4y = 56$
      $3x + 4y = 42$
   t) $7x + 3y = 56$
      $4x + 5y = 55$

j) $4x + 3y = 41$

$2x - 5y = 1$

x) $3f + 2d = 5$

$f - d = 5$

kh) $3x + y = 0$

$x + 2y = 1$

13) Laba tiro oo idil oo isku xiga ayay wadartoodu tahay 83. Sheeg labadaa tiro?

14) Odaybaa ka weyn inankiisa 18 sano. Wadarta da'doodu waa 58. Waa imisa jir odaygu?

15) 6 qalin iyo 10 mastaradood baan ku iibsan karraa 13 shilin, isla markaa 20 qalin iyo 12 mastaradood waxan ku iibsan karraa 22 shilin. Waa imisa qiimaha mastaraddu?

16) Laydi baa wareeggiisu yahay 40 mitir. Dhererku wuxuu le'eg yahay ballaadhkoo la afar laabay. Waa imisa dhererka laydigu?

17) Fasal baa 29 arday ku jiraan. Gabadh baa fasalkii loo soo beddelay. Iminka tirada wiilashu waa saddexlaabka tirada gabdhaha. Imisa wiil baa fasalka ku jira?

18) Oday baa 18 sannadood ka weyn inankiisa. 20 sannadood dabadeed, saamiga da'da odayga iyo ta inanku waa 8 : 5. Waa imisa da'da odeygu iyo ta inankuba?

19) Laba tiro oo kisi ah oo isku xiga bay wadartoodu tahay 64. Raadi labadaa tiro?

20) Wadarta laba tiro waxay le'eg tahay faraqooda oo la afar laabay. Labanlaabka ka weyni wuxuu le'eg yahay saddexlaabka ka yar oo 4 loo geeyay. Raadi labada tiro.

21) Xadhig baa laba gobol loo kala jaray. Labad gobol midkood baa ka kale 6 mitir ka dheer, saddexlaabkiina ah. Gobol walba dhererkiisu waa imisa?

22) Nin baa da'diisu tahay labanlaabka da'da wiilkiisa. 10 sannadood dabadeed, wiilka da'diisu waxay noqonaysaa intii da'da aabbihii ahayd 10 sannadood ka hor. Waa intee da'doodu iminka?

23) Tiro la saddexlaabay baa 3 dheer afarlaabka tiro kale. Labanlaabka tirada hore iyo saddexlaabka ta dambe ayaa isle'eg. Raadi labada tiro?

24) Tiro labo god leh ayay tirada godka kowaad tahay saddexlaabka tirada godka tobnaad. Marka godadka la kala beddelo, tirada cusub ayaa 18 dheer tii hore. Raadi tirada.

25) Wareegga laydi waa 50 mitir, dhererkuna 4 mitir buu ka weyn yahay ballaca oo labanlaaban. Raadi ballaca laydiga.

26) 5 sannadood dabadeed wiil baa da'diisu noqonaysaa labanlaabka da'diisii afar sannadood horteed. Iminka waa imisa jir wiilku?

27) Fududee:

b) $a^3 b^2 \times a^4 b^3 \div a^6 b^7$

t) $a^2 . a . b . c \div a^4 b^2$

j) $[(a^3 \div a^4) \div a^3] . a^7$

x) $a^2 . bc + ab^2 c$

kh) $(a^2 + ab)$

28) Fududee:

b) $\frac{3^4 \times 3^3}{2^3 \times 2^2}$

t) $\frac{2^3 \times 3}{2^2 \times 3^2}$

j) $\frac{5^4 \times 3^5}{5^3 \times 9^2}$

x) $\frac{4^2 \times 3^3}{2^5 \times 9^2}$

29) Fududee:

b) $(a^2 \cdot b^3)^2 \div a^3 b^2 c$

t) $(a^2 b^2 c^2 \div a^2 b^2 c)^4$

j) $\frac{(a^3 b^3 \div cd^4) \times (c^2 \cdot d^3)^4}{(a^2 b^3)^5 \div a^5 b^8}$

x) $[(a^2 b^3 c \div ab)^5 \div abc^2] \div a^6 b^{11} c^7$

kh) $a \cdot a \cdot a \cdot a \cdot b^2 \cdot c^2 \div a^3 b^2 c^2$

30) Soo saar taranta masalooyinka soo socda.

b) $(-b t^2) \cdot (4b^4 k^2)^3 s^3$

t) $(-4bt^2)^3 \times 8 (bt)^2$

j) $(-k)^4 \cdot (k^2 r^2)^3 \cdot (-r)^3$

x) $(0.4 s^3 t^2)^3 \cdot (-0.3 s^2 t^5)^2$

31) Fududee:

b) $x^2 (x^3 + 5) + x^2 (x + 7)$

t) $4 b^2 t (b^3 t^4 - b^2 + 4)$

32) Soo saar wadartooda:

b) $4x (3x + 4) - (11x^2 + 4x + s)$

t) $5 (3r - 2) - (4 + d)$

33) Taran kasta u qor sida ugu sahlan.

b) $(x + 4) \cdot (2x + 3)$

t) $(t + 6) \cdot (j + 4)$

34) Fududee:

b) $\frac{16x^2 + 4x}{2x}$

t) $\frac{2a - 5 + a^2 + a^3}{a + 2}$

j) $(4x^2 - 6x + x^3) \div (x - 2)$

x) $\frac{(2x + 4)^2 - (3x^2 + 32)}{x - 42}$

35) Raadi I.W.W. haltibixyada hoos ku qoran:

b) $48x^3 y^5$ iyo $32x^2 y^5$

t) $42x^2 y^5 w$; $28x^3 y^2 w^4$; $35x^5 y^4 w^3$

j) $72s^2 t^3 f^2$; $198s^3 t^3 f^3$; $54s^3 t^2 g^3$

x) $72s^2 t^3 f^4 w^5$; $40s^3 t^2 w$.

36) Raadi isirrada mutuxan ee:

b) 1008

t) 792

37) Haltibix kasta, raadi isirkiisa labaad:

b) $462x^2 y^3 = 33^2 y$ (.....)

t) $42x^2 y^2 w^5 = 14xy^2 w^2$ (.....)

j) $\frac{1}{3} x^2 y^2 = 5xy$ (.....)

x) $\frac{3}{5} xy^3 = \frac{4}{7} x^2 y$ (.....)

38) Raadi isirrada haddii ay suurtowdo:

b) $x^2 + ab + bx + ax$

t) $m^2 n + m^2 + 5n + 5m$

j) $x^3 - 21 - 3x^2 + 7x$

x) $7a^2 . 8 + 98ab$

39) Raadi taranta:

b) $(x + \frac{1}{2})$ $(x - \frac{1}{2})$

t) $(3r - 7)$ $(3r + 7)$

x) $(5m - \frac{3}{7})$ $(5m + \frac{3}{7})$

40) Raadi isirrada:

b) $\frac{9}{16} x^2 y^2 - 25$

t) $-64x^2 + 121y^2$

j) $\frac{1}{4} x^4 y^2 - \frac{4}{9}$

x) $a^6 b^4 t^2 - 49x^2$

kh) $16x^2 - \frac{1}{36}$

41) Raadi isirrada, deetana hubi:

b) $7x^2 - 63y^2$

t) $144x^2 - 24x + 1$

j) $25 - 15x + 9x^2$

x) $x^2 + 3x$

42) Raadi isirka maqan ee tibxaale kasta oo hoos ku qoran:

b) $x^4 + x^3 - 4x - 4$; isir $(x + 1)$

t) $x^6 - y^6$; isir $(x - 1)$

j) $b^2 + 3bt^2 + 3b^2 t + t^3$; isir $(b + t)$

43) Qeex erayada soo socda:

b) Isir

t) Tibix

j) Tibaax

x) Tibix saabley ah

kh) Tibix toosan

d) Madoorsoome

r) Doorsoome

s) Isireyn

sh) Saddextibix

44) Fududee jajabyadan adoo mid walba sheegaya qiimaha doorsoomuhu aanu qaadan karayn:

b) $\frac{2y}{7} \times \frac{14}{3y}$

t) $\frac{a-4}{a+2}$

j) $\frac{x^2 - 12x + 35}{2x - 14} \times \frac{x - 2}{x^2 - 5x}$

x) $\frac{(m+1)(m^2-25)}{(m^2+6m+5)}$

kh) $\frac{(t+1)^2}{4t^2+8t+4}$

45) Fududee xisaabahan hoos ku qoran:

b) $(x^2 + 4x + 4) \div (x^2 + 2x + 1)$

t) $(8 - 2a^2) \div (a^2 + a - 6)$

j) $(b^2 - 4b + 3) \div (b^2 - 3b)$

x) $(2x^2 - 128) \div (a^2 - 16a + 64)$

kh) $\{ xy \div wt \}$

46) Ma run baa mise waa been:

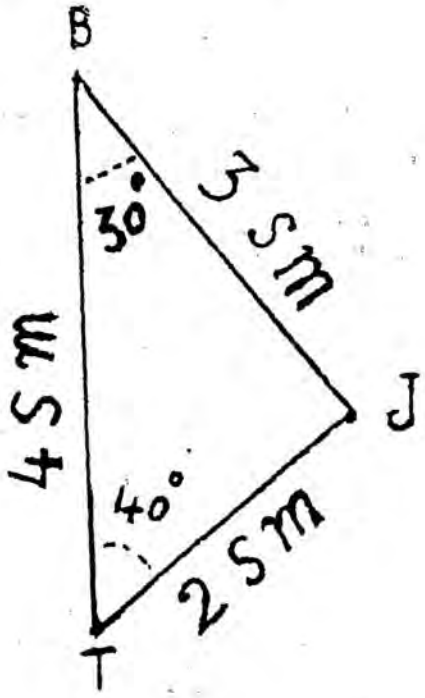
b) Haddii laba saddexagal ay isku sargo'an yihiin, isla markaas way isu eg yihiin.

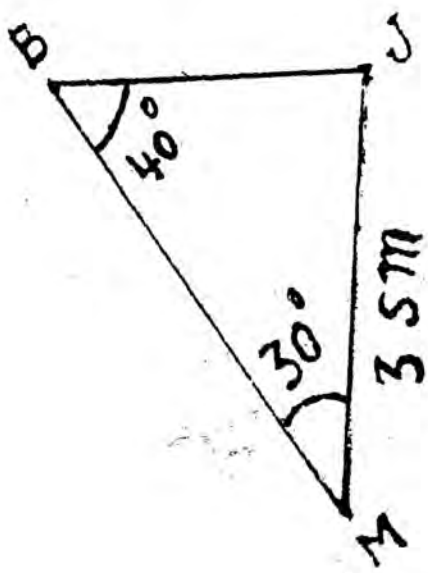
t) Haddii labo saddexagal isu eg yihiin, way isku sargo'an yihiin.

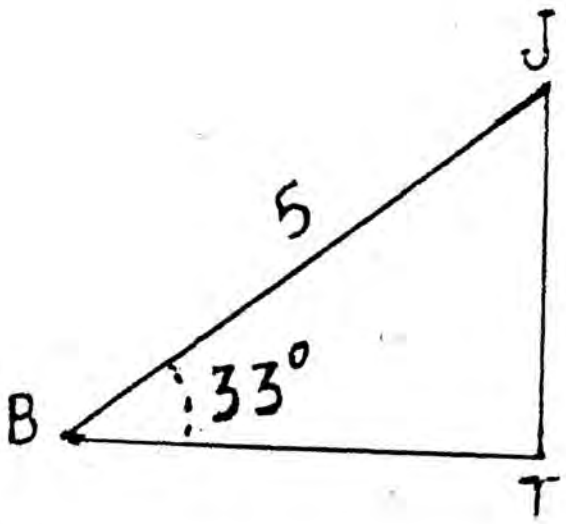
j) Haddii labo saddexagal oo qumman mid walba uu leeyahay xagal 40^0, labada saddexagal way isu eg yihiin.

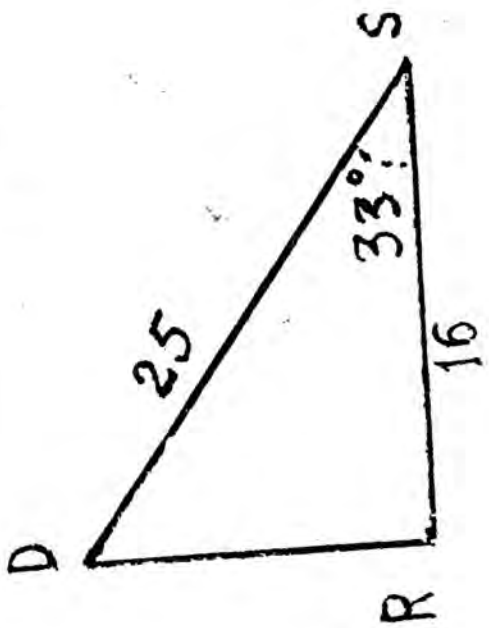
x) Laba saddexagal way isu eg yihiin haddii saamiga dhinacyadooda isku beegan ay isle'eg yihiin.

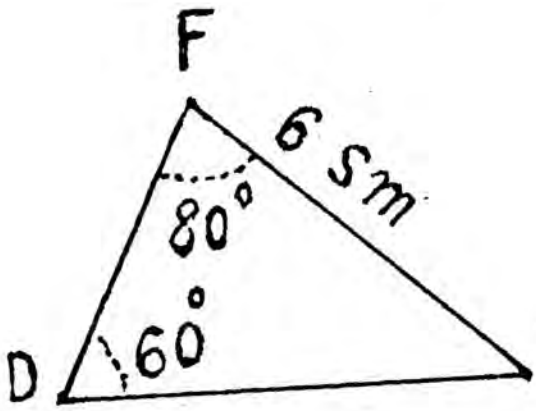
47) Lammaanayaashani saddexagallada ahi ma isu eg yihiin? Haddii ay haa tahay, raadi dhinacyada maqan:

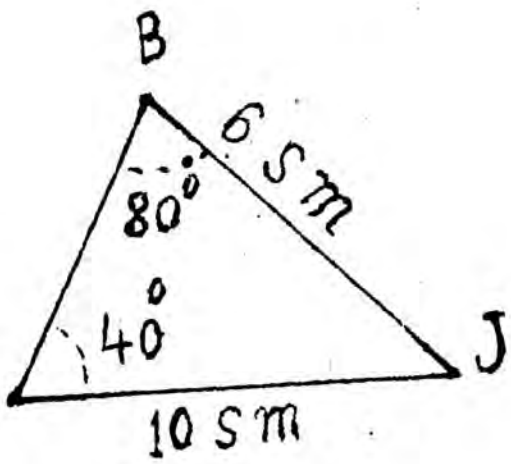

B
30°
3 SM
4 SM
J
40°
2 SM
T

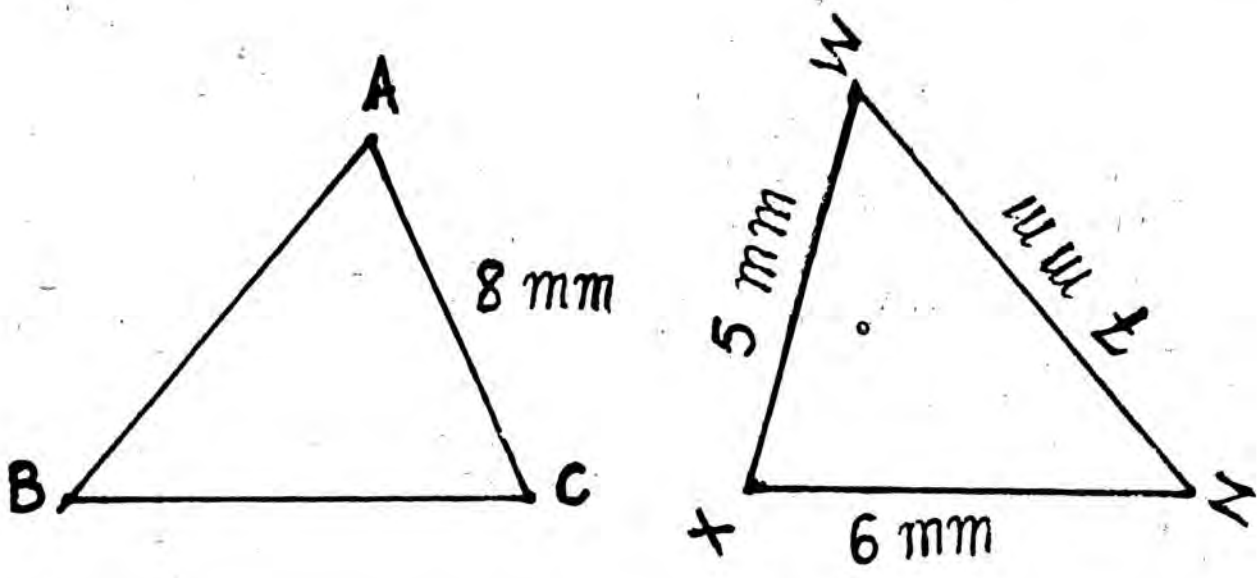

B
J
40°
30°
3 SM
M

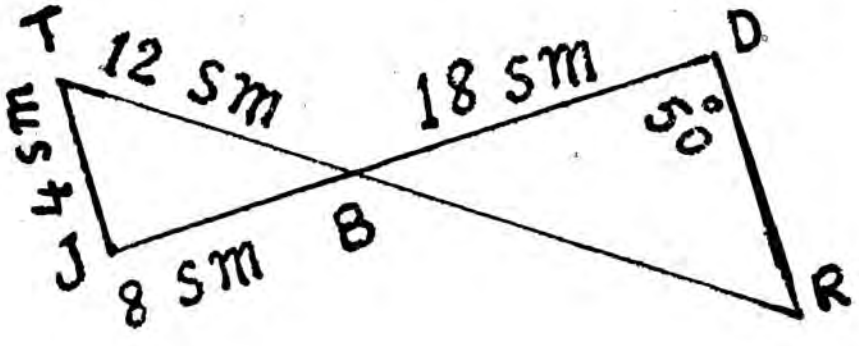

J
5
B
33°
T


S
33°
25
16
D
R


F
6 SM
80°
60°
D
R


B
6 SM
80°
40°
T
J
10 SM





48) Raadi dhererka hadhka tiir dhererkiisu yahay 8 mitir, haddii isla ammintaa hadhka daar 20 mitir ah uu dhererkiisu yahay 30 mitir?

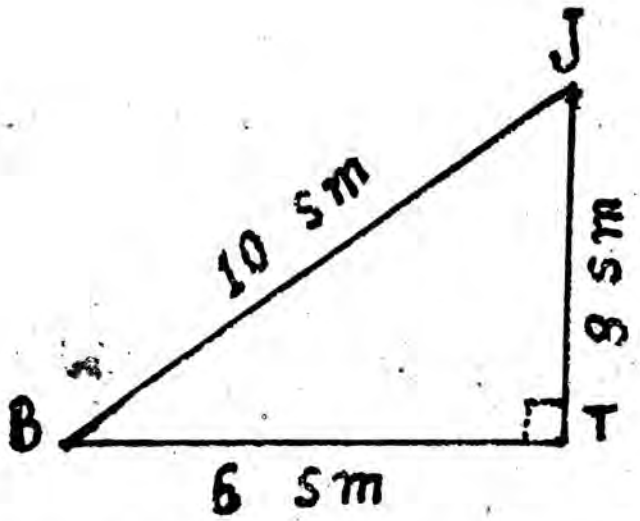
49) Saddexagalka qumman ee hoos ku yaal, BT = 6 mitir, JT = 8 mitir, BJ = 10 mitir.

Raadi:

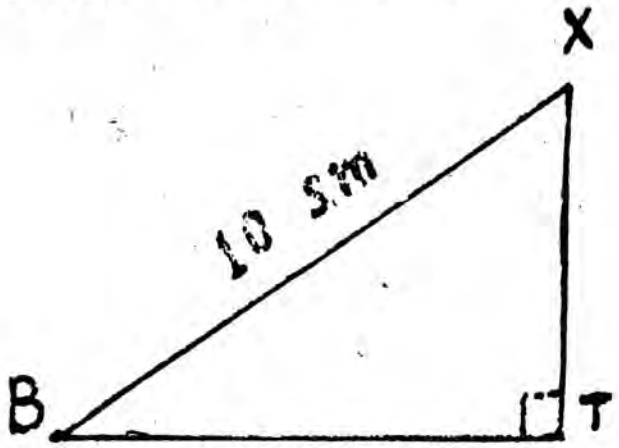
b) Tan ∡ B

t) Sin ∡ B

j) Cos ∡ B



50) Shaxanka hoos ku yaal, haddii sin ∠ B uu yahay 0.50000, waa inteé dhererka XT?



51) Sallaan 20 fuudh ah ayaa lagu tiiriyey gidaar jooggiisu yahay 12 fuudh. Haddii gunta sallaanku ay 16 fdh. u jirto gidaarka, raadi xagasha u dhaxaysa sallaanka iyo (b) dhulka (t) gidaarka.

Layli: NAQTIIN IV

1) b) Maxaa hakadyada si aad ah loogu baahan yahay marka urur kutirsaneyaashiisu tirooyin yihiin la qorayo?

t) Hakadyo ma loo baahan yahay marka aan haysanno urur kutirsanayaashiisu ay taswiirro yihiin?

2) Erayo ku tilmaan ururrada hoos ku yaal:

b) { a, e, i, o, u }

t) { b, d, r, g, l, m, n }

j) { Soomaaliaya, Itoobiya iyo Jabuuti }

x) { rag, dumar }

kh) { Hargeysa, Gabilay, Berbera, Boorama, Saylac }

d) { 1, 3, 5, ... }

r) { 1, 2, 3, 4, 6, 12 }

s) { 5, 10, 15, 20, ... }

sh) { Laascaanood, Eyl, Garoome }

3) Tax kutirsanayaasha ururradan:

b) Ururka gobollada J.D.S.

t) Ururka dhufsaneyaasha 3 ee ka yar 24.

j) Ururka mutuxannada 40 ka yar.

x) Ururka Xoghayeyaasha J.D.S. ee ku jira G.S.K.

kh) Ururka ardayda fasalkaaga ee safka hore fadhiista.

d) Ururka afafka aad dugsiga ku dhigatid.

r) Ururka tirooyinka idil ee 10 le'eg ama ka yar.

s) Ururka tirsiimo ee toban ka yar.

sh) Ururka abyooneyaasha togan ee toban ka yar.

dh) Ururka maalmaha toddobaadka ee shaqal ka bilowda.

4) Waa maxay urur madhani? Kuwee baa urur madhan ah.

b) Ururka Madaxweynayaasha J.D.S. ee 90 jir ah.

t) Ururka isirrada saddex ee 2 ka yar.

j) Ururka geela J.D.S. ee laba kurus leh.

x) { 0 }

5) Urur kasta oo hoos ku yaal, sheeg inta kutirsane ee uu leeyahay.

b) { 1, 2 }

t) { }

j) { o }

x) { 115 }

kh) { 0,13, 0.005 }

6) Haddii labo dhinac oo laydi ay isku sargo'an yihiin, ma odhan karnaa way isle'eg yihiin?

7) Ma run baa mise waa been.

b) Boosaaso = Xarunta Gobolka Bari ee J.D.S.

t) Jabuuti = Xarunta dalka Soomaaliyeed ee Faransiisku gumeysto.

j) Xamar = Magaalo ku taal dalka J.D.S.

x) Madaxweyne = Siyaad.

kh) $\frac{4+6}{2} = 1 + 4$

8) Waa maxay labo urur baa isudhigma? Ma isudhigmaan lammaankan ururrada ahi?

b) { b, t, j, r }, { 1,0,10, $\frac{5}{7}$ }

t) { 0 }, { 41, $\frac{1}{2}$ }

j) { { }, { 0 }, { 1 }, { 0,1 } } iyo

{ Cali, Cumar, Axmed, cabdi }

9) Raadi hormooyinka ururradan:

b) { 5, 7 }

t) { b, t, x }

10) Raadi isutagga ururradan:

b) { 2, 3, 5, 6 } iyo { 3, 5, 7, 8 }

t) { 0 } iyo { 1 }

j) { 5, 6, 7, 8 } iyo ∅

x) { 5, 6, 7, 8 } iyo { 6, 7 }

kh) A = ururka tirsiimada ee 5 ka yar iyo ururka tirooyinka idil ee 9 ka yar.

11) Raadi dhextaalka ururradan.

b) Ururka isirrada 80 iyo ururka isirrada 64.

t) { b, t, j, x }, { j, l, 2, b }

j) { 1,2,3,4,5,6,7,8,9,10 } iyo { 2,4,6,8,10,12,14,16,18 }

12) Ka shaqee masalooyinka hoos ku yaal haddii

B = { 1, 2, 3, 4, 5 }, T = { 0, 1, 3, 5, 7, 9, 11 }

iyo J = { 0 }

b) B ∩ T

t) B ∪ J

j) (T ∩ B) ∩ J

x) (T ∩ B) ∩ J

kh) (B ∪ T) ∩ J

13) Waa maxay:

b) Urur duleed

t) Urur guud

j) Dhextaal urur

x) Isutag urur.

14) Furfur isle'egyadan soo socda:

i) $|x| + 2|x| = 9$

ii) $|x| - 4 = 0$

iii) $\left|\frac{x}{2}\right| + 3|x| = 14$

iv) $|x| + |-7| = 7$

v) $|x| - |-5| = 8$

15) Samee xarriiq tiro, dabadeedna ku muuji tirooyinka soo socda:

i) -3

ii) $-2\frac{1}{2}$

iii) $2\frac{1}{2}$

iv) 4

16) Sawir sallax kaartis, dabadeedna ku muuji baraha kulannadooda lagu siiyey:

b) $y = x$

t) $y = 2x + 3$

j) $y = \frac{1}{2}x - 5$

x) $y = \frac{2}{3}x + 4$

kh) $x - y = 3$

d) $x = 3$

r) $y = -5$

s) $y = 2$

sh) $x = -1$

dh) $x + y = 0$

17) Samee garaafka isle'egyada toosan ee hoos ku yaal:

b) $y = x$

d) $x = 3$

t) $y = 2x + 3$

r) $y = -5$

j) $y = \frac{1}{2}x - 5$

s) $y = 2$

x) $y = \frac{2}{3}x + 4$

sh) $x = -1$

kh) $x - y = 3$

dh) $x + y = 0$

18) Furfur isle'egyadan wadajira adoo isticmaalaya habka garaafka.

b) $y = 2x + 3$
$y = x + 1$

t) $x + y = 0$
$x - 2y = 3$

j) $2x - y = 0$
$x = 3$

x) $x - y = 0$
$x + y = 0$

19) Qeex:

b) Tiiro

t) Tikraar

j) Madoorsoome

x) Kulan

20) Adoo isticmaalaya jidka tiirada, raadi tiirada isle'egyadan toosan.

b) $x + y = 0$

t) $x - y = 0$

j) $4x - y = 5$

x) $4x + y = 5$

kh) $4x + 2y = 5$

21) Korka ka sheeg tiirada isle'egyadan toosan:

b) $y = 3x + 5$

t) $y = -5x + 6$

j) $2y = -4x - 3$

x) $3y = 2x + 9$

kh) $-6y = 4x - 12$

22) Raadi tikraarka isle'egyadan toosan:

b) $2x + 3y = 6$

t) $2x - 8y = 4$

23) Raadi isle'egta xarriiqda toosan ee tiiradeedii iyo bar ku jirta laguu sheegay.

b) (5, 10) . . . . . $m = 2$

t) (2, 11) . . . . . $n = 3$

24) Raadi isle'egta xarriiqda toosan ee marta baraha kulannadooda lagu siiyey.

b) $(-2, 4)$; $(2, -1)$

t) (4, 0); (0,2)

25) Raadi isirrada tibaax kasta:

b) $12x^2 - 8x - 15$

t) $m^2 + 2mn - 360n^2$

j) $s^4 - 4s^2$

x) $81y^3 - 9y^5$

kh) $4 - 12s + 9s^2$

26) Furfur:

b) $(x + 2)(x - 3) = 0$

t) $(2x - 1)(3x + 4) = 0$

j) $x^2 - 25 = 0$

x) $y^2 - 9y^2 = 0$

kh) $x(x + 1)(x + 3) = 0$

27) Furfur isle'egyada saabley adoo kaashanaya isireyn.

b) $x^2 - 7x - 8 = 0$

t) $x(x + 1) + (x + 2)(x + 3) = 42$

j) $21b^3 - 12b^2 - 9b = 0$

x) $x^2 + 4 = 5x$

kh) $x^2 - 14x + 24 = 0$

28) Furfur isle'egyadan adoo isticmaalaya jidka isle'egta saabley.

b) $6x^2 - 7x - 3 = 0$

t) $3x^2 - 7x + 4 = 0$

j) $2x^2 - 9x + 9 = 0$

x) $x^2 - 17x + 16 = 0$

kh) $4x^2 + 5x = 26$

29) Furfur isle'egyadan, dabadeedna hubi:

b) $\frac{3}{8x^2} - \frac{5}{4x} + 1 = 0$

t) $\frac{1}{2} - \frac{1}{t} - \frac{4}{t^2} = 0$

30) Wadarta tiro iyo labajibbaarkeeda ayaa ah 56. Raadi tirada?

31) Bed laydi ayaa ah 100 mitir oo labajibbaaran. Ballacu 15 mitir buu dhererka ka yar yahay. Raadi ballaca iyo dhererka laydiga.

32) Raadi labada abyoone ee isku xiga ee wadarta labajibbaarkoodu tahay 61.

33) Laydi baa dhererkiisu ka weyn yahay afarlaabka ballaciisa 3 sm. Bedkiisu waa 10 sm^2. Raadi addimihiisa.

34) Da'da Cali waa labajibbaarka da'da Xaawa. 8 sannadood kaddib, da'da Cali waxay noqonaysaa da'da Xaawa oo la labanlaabay. Cali waa imisa jir hadda?

35) Labajibbaarka abyoone oo la labanlaabay baa 3 ka yar 7 laabka abyoonahaa. Raadi abyoonaha.

36) Raadi addimaha saddexagalka bedkiisu yahay 42 sm^2. haddii wadarta jooggiisa iyo salkiisu ay yihiin 19 sm.

37) Wadarta labajibbaarka laba abyoone togan oo isku xiga ayaa ah 100. Raadi abyooneyaasha.

38) Wadarta tiro iyo labajibbaarkeeda oo la labanlaabay waa 78. Raadi tirada.

39) Faraqa dhererka iyo ballaca laydi waa 8 sm. bedkiisuna waa 105 sm^2. Raadi dhererkiisa iyo ballaciisa.

40) Raadi joogga iyo salka saddexagal haddii wadartoodu tahay 18 sm. bedkiisuna yahay 40sm^2.

41) Tirada u qoran qormo saynis maxay kaga duwan tahay tirada caadiga ah?

42) U qor qormo saynis tirooyinka hoos ku qoran:

b) 14.32

t) 247.8

j) 0.00003214

x) 3.413

kh) 7789000

43) Ka shaqee xisaabaha hoos ku qoran:

b) $(1.008 \times 10^{-5})(3.3 \times 16^{6})$

t) $(4.96 \times 10^{-2})(8.2 \times 10^{-5})$

j) $(4.824 \times 10^{-3}) \div (9.649 \times 10^{-5})$

x) $(1.421 \times 10^{5}) \div (3.5 \times 10^{-5})$

kh) $(5.2 \times 10^{-5})(7.5 \times 10^{8})$

44) Ka dhig tiro sansaanta tobanle u qoran:

b) 4.052×10^{-3}

t) 3.412×10^{5}

45) Raadi Logardamka tirooyinkan adigoon tuse isticmaalin:

b) 1

t) 0.01

j) 1000

x) $\frac{1}{10}$

kh) 1,000,000,000

46) Raadi abyanka Logardamka ee

b) 4234

t) 0.000047689

j) 4.678

x) 1000

kh) 29.13

47) Adigoo kaashanaya tusaha Logardamka, raadi qurubka tirooyinkan:

b) 4.123

t) 2000

j) 41.34

x) 47.47

kh) 0.0007219

48) Raadi Logardamka tirooyinka hoos ku qoran:

b) 0.4342

t) 0.0001542

j) 423.1

x) $(44.3)^{3}$

kh) $\sqrt{1.48}$

49) Haddii Log 3 = 0.4771, Log 5 = 0.6990 iyo Log 7 = 0.8451, raadi Logardamka tirooyinkan adigoon isticmaalin tuse Log.

b) 350

t) 225

x) $\sqrt{147}$

kh) $\sqrt{(735)^3}$

50) Raadi Logardamka tirooyinkan:

b) $\dfrac{86 \times 0.45}{57.4}$

t) $\dfrac{48.7}{(83.8)\ (3.14)}$

j) $\dfrac{\sqrt{34.4}}{2.981}$

x) $\dfrac{57.26}{\sqrt[3]{0.382}}$

TUSE

SAYN KOSAYN TAANJANT

A°	SIN A	COS A	TAN A	A°	SIN A	COS A	TAN A
1	0.0175	0.9998	0.0175	45	0.7071	0.7071	1.0000
2	0.0349	0.9994	0.0349	46	0.7193	0.6947	1.0355
3	0.0523	0.9986	0.0524	47	0.7314	0.6820	1.0724
4	0.0698	0.9976	0.0699	48	0.7431	0.6691	1.1106
				49	0.7547	0.6561	1.1504
5	0.0872	0.9962	0.0875	50	0.7660	0.6428	1.1918
6	0.1045	0.9945	0.1051	51	0.7771	0.6293	1.2349
7	0.1219	0.9925	0.1228	52	0.7880	0.6157	1.2799
8	0.1392	0.9903	0.1405	53	0.7986	0.6018	1.3270
9	0.1564	0.9877	0.1584	54	0.8090	0.5878	1.3764
10	0.1736	0.9848	0.1763	55	0.8192	0.5736	1.4281
11	0.1908	0.9816	0.1944	56	0.8290	0.5592	1.4826
12	0.2079	0.9781	0.2126	57	0.8387	0.5446	1.5399
13	0.2250	0.9744	0.2309	58	0.8480	0.5299	1.6003
14	0.2419	0.9703	0.2493	59	0.8572	0.5150	1.6643

A°	SIN A	COS A	TAN A	A°	SIN A	COS A	TAN A
15	0.2588	0.9659	0.2679	60	0.8660	0.5000	1.7321
16	0.2756	0.9613	0.2867	61	0.8746	0.4848	1.8040
17	0.2924	0.9563	0.3057	62	0.8829	0.4695	1.8807
18	0.3090	0.9511	0.3249	63	0.8910	0.4540	1.9626
19	0.3256	0.9455	0.3443	64	0.8988	0.4384	2.0503
20	0.3420	0.9397	0.3640	65	0.9063	0.4226	2.1445
21	0.3584	0.9336	0.3839	66	0.9135	0.4067	2.2460
22	0.3746	0.9272	0.4040	67	0.9205	0.3907	2.3559
23	0.3907	0.9205	0.4245	68	0.9272	0.3746	2.4751
24	0.4067	0.9135	0.4452	69	0.9336	0.3584	2.6051
25	0.4226	0.9063	0.4663	70	0.9397	0.3420	2.7475
26	0.4384	0.8988	0.4877	71	0.9455	0.3256	2.9042
27	0.4540	0.8910	0.5095	72	0.9511	0.3090	3.0777
28	0.4695	0.8829	0.5317	73	0.9563	0.2924	3.2709
29	4848	8746	5543	74	9613	2756	3.4874
30	0.5000	0.8660	0.5774	75	0.9659	0.2588	3.7321
31	0.5150	0.8572	0.6000	76	0.9703	0.2419	4.0108
32	0.5299	0.8480	0.6249	77	0.9744	0.2250	4.3315
33	0.5446	0.8387	0.6494	78	0.9781	0.2079	4.7046
34	0.5592	0.8290	0.6745	79	0.9816	0.1908	5.1446
35	0.5736	0.8192	0.7002	80	0.9848	0.1736	5.6713
35	0.5878	0.8090	0.7265	81	0.9877	0.1564	6.3138
37	0.6018	0.7986	0.7536	82	0.9903	0.1392	7.1154
39	0.6293	0.7771	0.8098	84	0.9945	0.1045	9.5144
40	0.6428	0.7660	0.8391	85	0.9962	0.0872	11.4301
41	0.6561	0.7547	0.8693	96	0.9976	0.0698	14.3007
42	0.6691	0.7431	0.9004	87	0.9986	0.0523	19.0811
43	0.6820	0.7314	0.9325	88	0.9994	0.0349	28.6363
44	0.6947	0.7193	0.9657	89	0.9998	0.0175	57.2900

LOGARDAM

	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
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42	·6232	6243	6253	6263	6274	6284	6294	6304	6314	6325	1	2	3	4	5	6	7	8	9
43	·6335	6345	6355	6365	6375	6385	6395	6405	6415	6425	1	2	3	4	5	6	7	8	9
44	·6435	6444	6454	6464	6474	6484	6493	6503	6513	6522	1	2	3	4	5	6	7	8	9
45	·6532	6542	6551	6561	6571	6580	6590	6599	6609	6618	1	2	3	4	5	6	7	8	9
46	·6628	6637	6646	6656	6665	6675	6684	6693	6702	6712	1	2	3	4	5	6	7	7	8
47	·6721	6730	6739	6749	6758	6767	6776	6785	6794	6803	1	2	3	4	5	5	6	7	8
48	·6812	6821	6830	6839	6848	6857	6866	6875	6884	6893	1	2	3	4	4	5	6	7	8
49	·6902	6911	6920	6928	6937	6946	6955	6964	6972	6981	1	2	3	4	4	5	6	7	8
50	·6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1	2	3	3	4	5	6	7	8
51	·7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1	2	3	3	4	5	6	7	8
52	·7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1	2	2	3	4	5	6	7	7
53	·7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1	2	2	3	4	5	6	6	7
54	·7324	7332	7340	7348	7356	7364	7372	7380	7388	7396	1	2	2	3	4	5	6	6	7
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55	·7404	7412	7419	7427	7435	7443	7451	7459	7466	7474	1	2	2	3	4	5	5	6	7
56	·7482	7490	7497	7505	7513	7520	7528	7536	7543	7551	1	2	2	3	4	5	5	6	7
57	·7559	7566	7574	7582	7589	7597	7604	7612	7619	7627	1	2	2	3	4	5	5	6	7
58	·7634	7642	7649	7657	7664	7672	7679	7686	7694	7701	1	1	2	3	4	4	5	6	7
59	·7709	7716	7723	7731	7738	7745	7752	7760	7767	7774	1	1	2	3	4	4	5	6	7
60	·7782	7789	7796	7803	7810	7818	7825	7832	7839	7846	1	1	2	3	4	4	5	6	6
61	·7853	7860	7868	7875	7882	7889	7896	7903	7910	7917	1	1	2	3	4	4	5	6	6
62	·7924	7931	7938	7945	7952	7959	7966	7973	7980	7987	1	1	2	3	3	4	5	6	6
63	·7993	8000	8007	8014	8021	8028	8035	8041	8048	8055	1	1	2	3	3	4	5	5	6
64	·8062	8069	8075	8082	8089	8096	8102	8109	8116	8122	1	1	2	3	3	4	5	5	6
65	·8129	8136	8142	8149	8156	8162	8169	8176	8182	8189	1	1	2	3	3	4	5	5	6
66	·8195	8202	8209	8215	8222	8228	8235	8241	8248	8254	1	1	2	3	3	4	5	5	6
67	·8261	8267	8274	8280	8287	8293	8299	8306	8312	8319	1	1	2	3	3	4	5	5	6
68	·8325	8331	8338	8344	8351	8357	8363	8370	8376	8382	1	1	2	3	3	4	4	5	6
69	·8388	8395	8401	8407	8414	8420	8426	8432	8439	8445	1	1	2	2	3	4	4	5	6
70	·8451	8457	8463	8470	8476	8482	8488	8494	8500	8506	1	1	2	2	3	4	4	5	6
71	·8513	8519	8525	8531	8537	8543	8549	8555	8561	8567	1	1	2	2	3	4	4	5	5
72	·8573	8579	8585	8591	8597	8603	8609	8615	8621	8627	1	1	2	2	3	4	4	5	5
73	·8633	8639	8645	8651	8657	8663	8669	8675	8681	8686	1	1	2	2	3	4	4	5	5
74	·8692	8698	8704	8710	8716	8722	8727	8733	8739	8745	1	1	2	2	3	4	4	5	5
75	·8751	8756	8762	8768	8774	8779	8785	8791	8797	8802	1	1	2	2	3	3	4	5	5
76	·8808	8814	8820	8825	8831	8837	8842	8848	8854	8859	1	1	2	2	3	3	4	5	5
77	·8865	8871	8876	8882	8887	8893	8899	8904	8910	8915	1	1	2	2	3	3	4	4	5
78	·8921	8927	8932	8938	8943	8949	8954	8960	8965	8971	1	1	2	2	3	3	4	4	5
79	·8976	8982	8987	8993	8998	9004	9009	9015	9020	9025	1	1	2	2	3	3	4	4	5
80	·9031	9036	9042	9047	9053	9058	9063	9069	9074	9079	1	1	2	2	3	3	4	4	5
81	·9085	9090	9096	9101	9106	9112	9117	9122	9128	9133	1	1	2	2	3	3	4	4	5
82	·9138	9143	9149	9154	9159	9165	9170	9175	9180	9186	1	1	2	2	3	3	4	4	5
83	·9191	9196	9201	9206	9212	9217	9222	9227	9232	9238	1	1	2	2	3	3	4	4	5
84	·9243	9248	9253	9258	9263	9269	9274	9279	9284	9289	1	1	2	2	3	3	4	4	5
85	·9294	9299	9304	9309	9315	9320	9325	9330	9335	9340	1	1	2	2	3	3	4	4	5
86	·9345	9350	9355	9360	9365	9370	9375	9380	9385	9390	1	1	1	2	3	3	4	4	5
87	·9395	9400	9405	9410	9415	9420	9425	9430	9435	9440	0	1	1	2	2	3	3	4	4
88	·9445	9450	9455	9460	9465	9469	9474	9479	9484	9489	0	1	1	2	2	3	3	4	4
89	·9494	9499	9504	9509	9513	9518	9523	9528	9533	9538	0	1	1	2	2	3	3	4	4
90	·9542	9547	9552	9557	9562	9566	9571	9576	9581	9586	0	1	1	2	2	3	3	4	4
91	·9590	9595	9600	9605	9609	9614	9619	9624	9628	9633	0	1	1	2	2	3	3	4	4
92	·9638	9643	9647	9652	9657	9661	9666	9671	9675	9680	0	1	1	2	2	3	3	4	4
93	·9685	9689	9694	9699	9703	9708	9713	9717	9722	9727	0	1	1	2	2	3	3	4	4
94	·9731	9736	9741	9745	9750	9754	9759	9763	9768	9773	0	1	1	2	2	3	3	4	4
95	·9777	9782	9786	9791	9795	9800	9805	9809	9814	9818	0	1	1	2	2	3	3	4	4
96	·9823	9827	9832	9836	9841	9845	9850	9854	9859	9863	0	1	1	2	2	3	3	4	4
97	·9868	9872	9877	9881	9886	9890	9894	9899	9903	9908	0	1	1	2	2	3	3	4	4
98	·9912	9917	9921	9926	9930	9934	9939	9943	9948	9952	0	1	1	2	2	3	3	4	4
99	·9956	9961	9965	9969	9974	9978	9983	9987	9991	9996	0	1	1	2	2	3	3	3	4
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	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
·00	1000	1002	1005	1007	1009	1012	1014	1016	1019	1021	0	0	1	1	1	1	2	2	2
·01	1023	1026	1028	1030	1033	1035	1038	1040	1042	1045	0	0	1	1	1	1	2	2	2
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·03	1072	1074	1076	1079	1081	1084	1086	1089	1091	1094	0	0	1	1	1	1	2	2	2
·04	1096	1099	1102	1104	1107	1109	1112	1114	1117	1119	0	1	1	1	1	2	2	2	2
·05	1122	1125	1127	1130	1132	1135	1138	1140	1143	1146	0	1	1	1	1	2	2	2	2
·06	1148	1151	1153	1156	1159	1161	1164	1167	1169	1172	0	1	1	1	1	2	2	2	2
·07	1175	1178	1180	1183	1186	1189	1191	1194	1197	1199	0	1	1	1	1	2	2	2	2
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·10	1259	1262	1265	1268	1271	1274	1276	1279	1282	1285	0	1	1	1	1	2	2	2	3
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·17	1479	1483	1486	1489	1493	1496	1500	1503	1507	1510	0	1	1	1	2	2	2	3	3
·18	1514	1517	1521	1524	1528	1531	1535	1538	1542	1545	0	1	1	1	2	2	2	3	3
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·30	1995	2000	2004	2009	2014	2018	2023	2028	2032	2037	0	1	1	2	2	3	3	4	4
·31	2042	2046	2051	2056	2061	2065	2070	2075	2080	2084	0	1	1	2	2	3	3	4	4
·32	2089	2094	2099	2104	2109	2113	2118	2123	2128	2133	0	1	1	2	2	3	3	4	4
·33	2138	2143	2148	2153	2158	2163	2168	2173	2178	2183	0	1	1	2	2	3	3	4	4
·34	2188	2193	2198	2203	2208	2213	2218	2223	2228	2234	1	1	2	2	3	3	4	4	5
·35	2239	2244	2249	2254	2259	2265	2270	2275	2280	2286	1	1	2	2	3	3	4	4	5
·36	2291	2296	2301	2307	2312	2317	2323	2328	2333	2339	1	1	2	2	3	3	4	4	5
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·42	2630	2636	2642	2649	2655	2661	2667	2673	2679	2685	1	1	2	2	3	4	4	5	6
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·50	3162	3170	3177	3184	3192	3199	3206	3214	3221	3228	1	1	2	3	4	4	5	6	7
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·53	3388	3396	3404	3412	3420	3428	3436	3443	3451	3459	1	2	2	3	4	5	6	6	7
·54	3467	3475	3483	3491	3499	3508	3516	3524	3532	3540	1	2	2	3	4	5	6	6	7
·55	3548	3556	3565	3573	3581	3589	3597	3606	3614	3622	1	2	2	3	4	5	6	7	7
·56	3631	3639	3648	3656	3664	3673	3681	3690	3698	3707	1	2	3	3	4	5	6	7	8
·57	3715	3724	3733	3741	3750	3758	3767	3776	3784	3793	1	2	3	3	4	5	6	7	8
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	3890	3899	3908	3917	3926	3936	3945	3954	3963	3972	1	2	3	4	5	5	6	7	8
·60	3981	3990	3999	4009	4018	4027	4036	4046	4055	4064	1	2	3	4	5	6	6	7	8
·61	4074	4083	4093	4102	4111	4121	4130	4140	4150	4159	1	2	3	4	5	6	7	8	9
·62	4169	4178	4188	4198	4207	4217	4227	4236	4246	4256	1	2	3	4	5	6	7	8	9
·63	4266	4276	4285	4295	4305	4315	4325	4335	4345	4355	1	2	3	4	5	6	7	8	9
·64	4365	4375	4385	4395	4406	4416	4426	4436	4446	4457	1	2	3	4	5	6	7	8	9
·65	4467	4477	4487	4498	4508	4519	4529	4539	4550	4560	1	2	3	4	5	6	7	8	9
·66	4571	4581	4592	4603	4613	4624	4634	4645	4656	4667	1	2	3	4	5	6	7	9	10
·67	4677	4688	4699	4710	4721	4732	4742	4753	4764	4775	1	2	3	4	5	7	8	9	10
·68	4786	4797	4808	4819	4831	4842	4853	4864	4875	4887	1	2	3	4	6	7	8	9	10
·69	4898	4909	4920	4932	4943	4955	4966	4977	4989	5000	1	2	3	5	6	7	8	9	10
·70	5012	5023	5035	5047	5058	5070	5082	5093	5105	5117	1	2	4	5	6	7	8	9	11
·71	5129	5140	5152	5164	5176	5188	5200	5212	5224	5236	1	2	4	5	6	7	8	10	11
·72	5248	5260	5272	5284	5297	5309	5321	5333	5346	5358	1	2	4	5	6	7	9	10	11
·73	5370	5383	5395	5408	5420	5433	5445	5458	5470	5483	1	3	4	5	6	8	9	10	11
·74	5495	5508	5521	5534	5546	5559	5572	5585	5598	5610	1	3	4	5	6	8	9	10	12
·75	5623	5636	5649	5662	5675	5689	5702	5715	5728	5741	1	3	4	5	7	8	9	10	12
·76	5754	5768	5781	5794	5808	5821	5834	5848	5861	5875	1	3	4	5	7	8	9	11	12
·77	5888	5902	5916	5929	5943	5957	5970	5984	5998	6012	1	3	4	5	7	8	10	11	12
·78	6026	6039	6053	6067	6081	6095	6109	6124	6138	6152	1	3	4	6	7	8	10	11	13
·79	6166	6180	6194	6209	6223	6237	6252	6266	6281	6295	1	3	4	6	7	9	10	11	13
80	6310	6324	6339	6353	6368	6383	6397	6412	6427	6442	1	3	4	6	7	9	10	12	13
·81	6457	6471	6486	6501	6516	6531	6546	6561	6577	6592	2	3	5	6	8	9	11	12	14
·82	6607	6622	6637	6653	6668	6683	6699	6714	6730	6745	2	3	5	6	8	9	11	12	14
·83	6761	6776	6792	6808	6823	6839	6855	6871	6887	6902	2	3	5	6	8	9	11	13	14
·84	6918	6934	6950	6966	6982	6998	7015	7031	7047	7063	2	3	5	6	8	10	11	13	15
·85	7079	7096	7112	7129	7145	7161	7178	7194	7211	7228	2	3	5	7	8	10	12	13	15
·86	7244	7261	7278	7295	7311	7328	7345	7362	7379	7396	2	3	5	7	8	10	12	13	15
·87	7413	7430	7447	7464	7482	7499	7516	7534	7551	7568	2	3	5	7	9	10	12	14	16
·88	7586	7603	7621	7638	7656	7674	7691	7709	7727	7745	2	4	5	7	9	11	12	14	16
·89	7762	7780	7798	7816	7834	7852	7870	7889	7907	7925	2	4	5	7	9	11	13	14	16
·90	7943	7962	7980	7998	8017	8035	8054	8072	8091	8110	2	4	6	7	9	11	13	15	17
·91	8128	8147	8166	8185	8204	8222	8241	8260	8279	8299	2	4	6	8	9	11	13	15	17
·92	8318	8337	8356	8375	8395	8414	8433	8453	8472	8492	2	4	6	8	10	12	14	15	17
·93	8511	8531	8551	8570	8590	8610	8630	8650	8670	8690	2	4	6	8	10	12	14	16	18
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·95	8913	8933	8954	8974	8995	9016	9036	9057	9078	9099	2	4	6	8	10	12	15	17	19
·96	9120	9141	9162	9183	9204	9226	9247	9268	9290	9311	2	4	6	8	11	13	15	17	19
·97	9333	9354	9376	9397	9419	9441	9462	9484	9506	9528	2	4	7	9	11	13	15	17	20
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