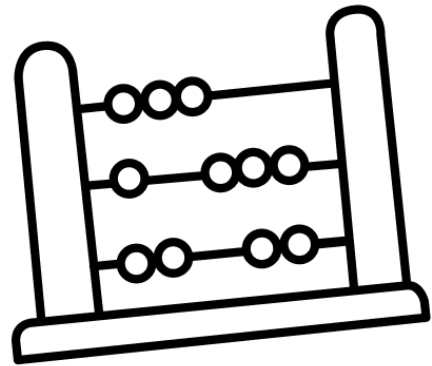


Xiriirrada Isku-darka (Additive relationships)



Maths

Cutub: Tibaaxaha iyo qaaciidooyinka (Expressions and formulae)

Natiijo

Waxaan fahmi karaa in xiriirka isku-darka (additive relationship) ee u dhexeeya doorsoomayaasha (variables) loo qori karo siyaabo kala duwan.

Erayada muhiimka ah

Isla'egta (equation) waxaa loo isticmaalaa in lagu muujiyo laba tibaaxood oo isu eg.

Xiriirrada Isku-darka (Additive relationships)



Dib-u-habaynta xiriirrada isku-darka (Rearranging additive relationships)



Wadarta (sum) ereyada badan sida hal erey

Qoysaska xaqiiqda (Fact families):

$$7 + 3 = 10$$

$$10 - 3 = 7$$

$$3 + 7 = 10$$

$$10 - 7 = 3$$

Waxaa laga yaabaa inaad aragtay tan loo yaqaan qoyska xaqiiqda (fact-family).

Waxaan sidoo kale ugu yeeri karnaa qoyska dib-u-habaynta (family of rearrangements) ee isla'egta $7 + 3 = 10$

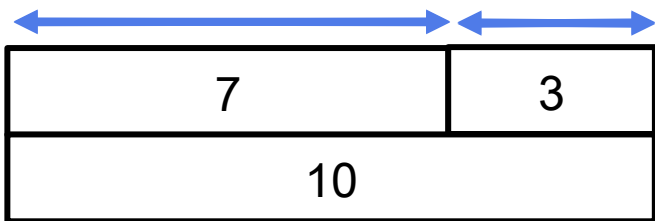
Qoysaska xaqiiqda (Fact families):

$$7 + 3 = 10$$

$$10 - 3 = 7$$

$$3 + 7 = 10$$

$$10 - 7 = 3$$



Moodellada bar (Bar models) waa hab wanaagsan oo lagu sawiro qoys kasta oo dib-u-habayn ah.

Dhererka 7 iyo 3 bar ayaa sameeya 10 bar.

Dhererka 3 iyo 7 bar ayaa sameeya 10 bar.

Qoysaska xaqiiqda (Fact families):

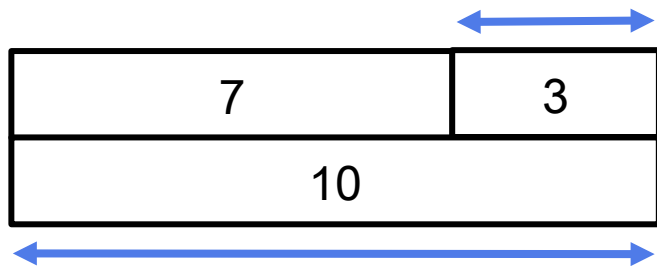
$$7 + 3 = 10$$

$$3 + 7 = 10$$

$$10 - 3 = 7$$

$$10 - 7 = 3$$

Moodellada bar (Bar models) waa hab wanaagsan oo lagu sawiro qoys kasta oo dib-u-habayn ah.



Dhererka 10 bar marka laga gooyo 3 bar ayaa ka hadha 7 bar.

Qoysaska xaqiiqda (Fact families):

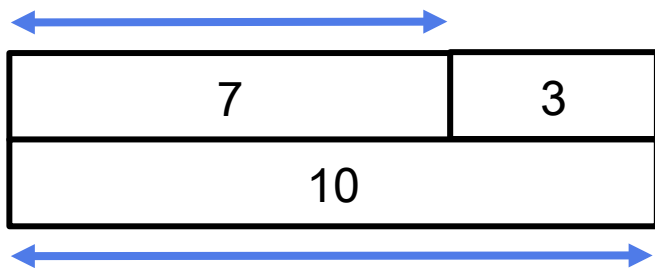
$$7 + 3 = 10$$

$$10 - 3 = 7$$

$$3 + 7 = 10$$

$$10 - 7 = 3$$

Qaababka bari (bar models) waa hab wanaagsan oo lagu sawiro qoys kasta oo dib-u-habayn ah.



Dhererka 10 bar (bar) laga jaray 7 bar (bar) wuxuu ka tagayaa 3 bar (bar).

Dib-u-habaynta xiriirrada isku-dhafka (additive relationships)

Dhammeystir qoyska dib-u-habaynta (rearrangements) ee isla'egta (equation) $65 + 35 = 100$

$$65 + 35 = 100$$

$$[] - 3 [] 65 []$$

$$[] + 6 [] 10 []$$

$$[] - 6 [] 35 []$$

65	35
100	

Dib-u-habaynta xiriirrada isku-dhafka (additive relationships)

Xisaabta (mathematics), guudmarku (generalising) waa qalab aad u xoog badan.

$$a + b = c \quad c - b = a$$

$$b + a = c \quad c - a = b$$

$$x + 7 = 31$$

$$[] - [] = []$$

$$[] + [] = []$$

$$[] - [] = []$$

a, b, iyo c waxay qaadan karaan qiime kasta, ama nooc kasta, laakiin inta $a + b = c$, dhammaan dib-u-habayntan (rearrangements) waxay noqon doonaan kuwa run ah.

Sidee buu u ekaan doonaa qoyskan dib-u-habaynta (rearrangements)?

Dib-u-habaynta xiriirrada isku-dhafka (additive relationships)

Xisaabta (mathematics), guudmarku (generalising) waa qalab aad u xoog badan.

$$a + b = c \quad c - b = a$$

$$b + a = c \quad c - a = b$$

$$x + 7 = 31 \quad 31 - 7 = x$$

$$7 + x = 31 \quad 31 - x = 7$$

a, b, iyo c waxay qaadan karaan qiime kasta, ama nooc kasta, laakiin inta $a + b = c$, dhammaan dib-u-habayntan (rearrangements) waxay noqon doonaan kuwa run ah.

Tani waa xirfad aad waxtar u leh, sababtoo ah dib-u-habayntan (rearrangement) waxay na siinaysaa milanka (solution) isla'egtan (equation).

Dib-u-habaynta xiriirrada isku-dhafka (additive relationships)

Muhiim ma aha sida uu u adag yahay qaabka ereyada (terms). Weli waannu dib-u-habayn (rearrange) karnaa isla'egta (equation).

$$\boxed{} + 2\boxed{} = 63\boxed{}$$

$$63 - 2y^2 = 13$$

$$\boxed{} + 1\boxed{} = 63\boxed{}$$

$$\boxed{} + 1\boxed{} = 2y\boxed{}$$

13	$2y^2$
63	

Dib-u-habaynta xiriirrada isku-dhafka (additive relationships)

Kuwani kee baa ah dib-u-habayn (rearrangements) sax ah oo isla'egtan (equation) ah? $2e - 5f^3 = g$

a



b



c



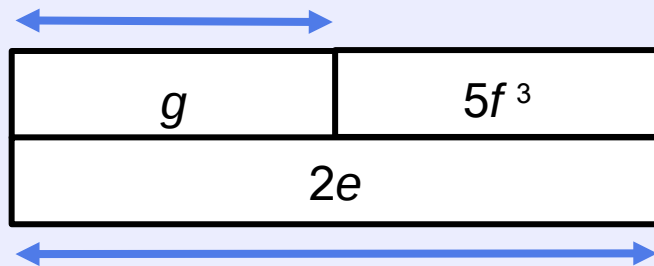
Jawaabaha:

d $5f^3 = 2e$

~~$5f^3 - 2e = g$~~

$2e - g = 5f^3$

$g - 5f^3 = 2e$



1) Qor qoyska dib-u-habaynta (rearrangements) ee isla'egyada (equations) hoose. Sawir qaab bari (bar model) haddii loo baahdo.

a)

$$58 + 76 = 134$$

$$\boxed{} + \boxed{} = \boxed{}$$

$$\boxed{} - \boxed{} = \boxed{}$$

$$\boxed{} - \boxed{} = \boxed{}$$

b)

$$\boxed{} + \boxed{} = \boxed{}9$$

$$19 - h = 11$$

$$\boxed{} + \boxed{}1 = \boxed{}9$$

$$\boxed{} - \boxed{}1 = \boxed{}$$

c)

$$\boxed{} + \boxed{} = \boxed{}$$

$$\boxed{} - \boxed{} = \boxed{}$$

$$\boxed{} + \boxed{} = \boxed{}$$

$$y - x = 3$$

d)

$$\boxed{} + \boxed{} = \boxed{}$$

$$100 - 2x = 5y^2$$

$$\boxed{} + \boxed{} = \boxed{}$$

$$\boxed{} - \boxed{} = \boxed{}$$

2) Cabdi wuxuu dib-u-habaynayaa (rearranging) isla'egyada (equations).

a)

Haddii $3v + 5w = 52$ markaas
 $5w + 3v = 52$ sidoo kale waa run.

b)

Haddii $73 - 8x = 49$ markaas
 $73 - 49 = 8x$ sidoo kale waa run.

c)

Haddii $3x - 2 = 8y$ markaas
 $8y - 2 = 3x$ sidoo kale waa run.

Waxaan u arkayaa in badan oo ka mid ah sida 'isku beddelka boosaska' ee isla'egta.



Xaalad kasta go'aami haddii Cabdi uu sax yahay oo qor jumlad si aad u caddayso go'aankaaga.

1) Qor qoyska dib-u-habaynta ee isla'egyada hoose. Sawir qaabka bar (bar model) haddii loo baahdo.

a)

$$58 + 76 = 134$$

$$\boxed{} - \boxed{} = \boxed{}$$

$$\boxed{} + \boxed{} = \boxed{}$$

$$\boxed{} - \boxed{} = \boxed{}$$

58	76
134	

b)

$$\boxed{} + \boxed{} = \boxed{}9$$

$$19 - h = 11$$

$$\boxed{} + \boxed{}1 = \boxed{}9$$

$$\boxed{} - \boxed{}1 = \boxed{}$$

11	h
19	

1) Qor qoyska dib-u-habaynta ee isla'egyada hoose. Sawir qaabka bar (bar model) haddii loo baahdo.

3	x
y	

$5y^2$	$2x$
100	

c)

+ =	- =
+ =	$y - x = 3$

d)

+ =	$100 - 2x = 5y^2$
+ =	- =

2) Cabdi wuxuu dib-u-habaynayaa isla'egyada.

a)

Haddii $3v + 5w = 52$ markaas

$5w + 3v = 52$ sidoo kale waa run.

$$3v + 5w = 52$$

$$5w + 3v = 52$$

Run. Tani waa tusaale ka mid ah is-beddelka (commutativity) ee isku darka.

Waxaan u arkayaa in badan oo ka mid ah sida 'isku beddelka boosaska' ee isla'egta.



Xaalad kasta go'aami haddii Cabdi uu sax yahay oo qor jumlad si aad u caddayso go'aankaaga.

2) Cabdi wuxuu dib-u-habaynayaa isla'egyada.

b)

Haddii $73 - 8x = 49$ markaas
 $73 - 49 = 8x$ sidoo kale waa run.

$$73 - 8x = 49$$

$$73 - 49 = 8x$$

Run. $8x$ iyo 49 waxay is-weydaarsan karaan boosaska sababtoo ah waxaan u malayn karnaa 73 inay tahay wadarta (sum).

49	$8x$
73	

Ka jar mid ka mid ah kuwa lagu daray (addend) wadarta (sum) waxaad ka tagtaa kan kale.



2) Cabdi wuxuu dib u habaynayaa isleegyada (equations).

b)

Haddii $73 - 8x = 49$ markaas
 $73 - 49 = 8x$ sidoo kale waa run.

$$73 - 8x = 49$$

$$73 - 49 = 8x$$

Run. $8x$ iyo 49 waxay is-weydaarsan karaan boosaska sababtoo ah waxaan u malayn karnaa 73 inay tahay wadarta (sum).

$$c - b = a$$

Waa isku mid sida guud ahaan (generalisation) $a + b = c$

$$c - a = b$$

Sababtoo ah c waa wadarta (sum), a iyo b waxay is-weydaarsan karaan boosaska.

2) Cabdi wuxuu dib u habaynayaa isleegyada (equations).

b)

Haddii $73 - 8x = 49$ markaas
 $73 - 49 = 8x$ sidoo kale waa run.

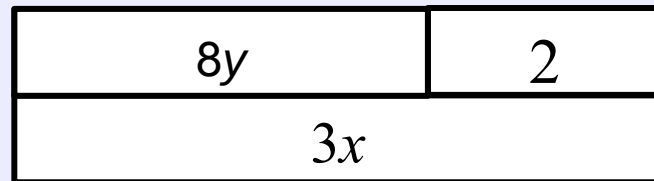
$$73 - 8x = 49$$

$$73 - 49 = 8x$$

Run. $8x$ iyo 49 waxay is-weydaarsan karaan boosaska sababtoo ah waxaan u malayn karnaa 73 inay tahay wadarta (sum).

Ogsoonow hufnaanta (efficiency) halkan. Haddii nala weydiiyay inaan xallino $73 - 8x = 49$, dib-u-habaynta $73 - 49 = 8x$ waxay nagu soo dhoweysaa xal (solution).

2) Cabdi wuxuu dib u habaynayaa isleegyada (equations).



c)

Haddii $3x - 2 = 8y$ markaas
 $8y - 2 = 3x$ sidoo kale waa run.

$$3x - 2 = 8y$$

$$8y - 2 = 3x$$

Ma aha run. $3x$ iyo $8y$ ma is-weydaarsan karaan boosaska.

$3x$ waa wadarta (sum) marka kaliya 2 iyo $8y$ ayaa beddeli kara boosaska.

Xiriirrada isku-darka (additive relationships)



Dib-u-habaynta xiriirrada isku-darka (additive relationships)



Wadarta (sum) ereyo badan oo hal erey ah

Isla'egtan ma leedahay qoys xaqiiqo (fact family)?

$$6 + 3 + 1 = 10$$

Isla'egtan ma leedahay qoys xaqiiqo (fact family)?

$$6 + 3 + 1 = 10$$

$$6 + 3 = 10 - 1$$

$$6 = 10 - 1 - 3$$

$$6 + 1 + 3 = 10$$

$$6 + 1 = 10 - 3$$

$$6 = 10 - 3 - 1$$

$$3 + 1 + 6 = 10$$

$$3 + 1 = 10 - 6$$

$$3 = 10 - 6 - 1$$

$$3 + 6 + 1 = 10$$

$$3 + 6 = 10 - 1$$

$$3 = 10 - 1 - 6$$

$$1 + 6 + 3 = 10$$

$$1 + 6 = 10 - 3$$

$$1 = 10 - 3 - 6$$

$$1 + 3 + 6 = 10$$

$$1 + 3 = 10 - 6$$

$$1 = 10 - 6 - 3$$

Haa. Laakiin, waa qoys aad uga weyn!

Wadarta (sum) ereyo badan oo hal erey ah

Waxaa jira hab wax ku ool ah oo loo tixgeliyo dib-u-habaynta ereyo badan oo sidan oo kale ah.

$$7 + 2 + 1 = 10$$

Haddii aan dooneyno inaan 7 uga tagno dhinaca LHS.

$$7 + 2 = 10 - 1$$

Ka jar ereyga 1 labada dhinac.

$$7 = 10 - 1 - 2$$



Ka jar ereyga 2 labada dhinac.

Wadarta (sum) ereyo badan oo hal erey ah

Waxaa jira hab wax ku ool ah oo loo tixgeliyo dib-u-habaynta ereyo badan oo sidan oo kale ah.

$$7 + 2 + 1 = 10$$

$$7 + \cancel{2+1} = 10$$

$$7 + 2 = 10 - 1$$

$$7 = 10 - (2 + 1)$$



$$7 = 10 - 1 - 2$$



Si loo noqdo mid wax ku ool ah, ma isku koobi karnaa ereyada 2 iyo 1, u qaadano hal erey, oo si wada jir ah uga jarnaa?

Wadarta (sum) ereyo badan oo hal erey ah

Waxaa jira hab wax ku ool ah oo loo tixgeliyo dib-u-habaynta ereyo badan oo sidan oo kale ah.



Adiga oo ka dhigaya wadarta (sum) ereyo badan hal erey, waxaan ka dhignay habka mid wax ku ool ah.



Jawaabaha:

$$7 + 2 + 1 = 10$$

$$7 + 2 = 10 - 1$$

$$7 + 2 + 1 = 10$$

$$7 = 10 - 1 - 2$$

$$(2 + 1) \quad 7 = 10 - (2 + 1)$$

Tani waxay sidoo kale u shaqeysaa ereyada aljabrada (algebraic terms).



Adigoo ka dhigaya wadarta (sum) ereyo badan hal erey (term),
waxaan ka dhignay habka mid waxtar badan.

Jawaabaha:



$$\begin{array}{lclclcl} (b + 5) & a + b + 5 = 10 & 7 + 2 + 1 = 10 & (2 + 1) \\ 7 = 10 - (2 + 1) & a = 10 - (b + 5) & (3y^2 + 4) & x + 3y^2 + 4 = 7 \\ x = 7 - (3y^2 + 4) & & & \end{array}$$

Wadarta (sum) ereyo badan sida hal erey (term)

Kuwani midkee baa ah habayn sax ah oo isla'egtan (equation) ah?

a



U qaado $(8y + 4z)$ sida hal erey (term) oo ka jar labada dhinac.

b



Waa in $(8y + 4z)$ laga jaraa labada dhinac.

c



U beddel (commute) si $8y + 7x^2 + 4z = 16$, kooxee $(7x^2 + 4z)$ oo ka jar labada dhinac.

Jawaabaha:

$$7x^2 + 8y + 4z = 16$$

$$8y = 16 - (7x^2 + 4z)$$

$$7x^2 = 16 - (8y + 4z)$$

$$7x^2 = 16 + (8y + 4z)$$

Axmed wuxuu ku tababbaran yahay xirfaddan fasalka dhexdiisa.

$a = 10 - (b + 5)$ waxay la mid tahay $a = 10 - b + 5$
Uma baahna qawska (brackets).



Haddii aan ka shakiyo wax-is-beddelka aljabrada (algebraic manipulation), waxaan isku dayi karnaa isla beddelka tiro la mid ah si aan u tijaabino runta.

$$20 = 30 - (7 + 3)$$

$$20 = 30 - 7 + 3$$

Haddii Axmed sax yahay, labadan isla'eg (equation) tirooyin waa run. Miyay yihiin?

Axmed wuxuu ku tababbaran yahay xirfaddan fasalka dhexdiisa.

$$a = 10 - (b + 5) \text{ waxay la mid tahay } a = 10 - b + 5$$

Uma baahna qawska (brackets).



Haddii aan ka shakiyo wax-is-beddelka aljabrada (algebraic manipulation), waxaan isku dayi karnaa isla beddelka tiro la mid ah si aan u tijaabino runta.

$$20 = 30 - (7 + 3)$$

$$20 = 30 - (10) = 20$$

Qawska (brackets) waa muhiim!

$$20 = 30 - 7 + 3$$

$$20 \neq 26$$

Tani ma aha isla'eg (equation).

Axmed wuxuu ku tababbaran yahay xirfaddan fasalka dhexdiisa.

Waa hubaal! Qawska (brackets) waa muhiim! Waa inaan ka jaraa labada erey (term) ee qawska ku dhex jira.

$$20 = 30 - (7 + 3) \text{ wuxuu noqdaa } 20 = 30 - 7 - 3$$



$$20 = 30 - (7 + 3)$$

$$20 = 30 - 7 - 3$$

Biraketo (Brackets) waa muhiim!

$$20 = 20$$

Wadarta ereyo badan (sum of multiple terms) sida hal erey

U kala saar y iyo tirooyinka (integer terms) dhinaca LHS, ka jar labada dhinac, oo fududee halka ay suurtagal tahay.

$$3x + 7y + 27 = 85$$

$$3x + (7y + 27) = 85$$

$$3x = 85 - (7y + 27)$$

$$3x = 85 - 7y - 27$$

$$3x = 58 - 7y$$

Wadarta ereyo badan (sum of multiple terms) sida hal erey

U kala saar y iyo tirooyinka (integer terms)
dhinaca LHS, ka jar labada dhinac, oo fududee
halka ay suurtagal tahay.

$$3x + 7y + 27 = 85$$

$$3x + (7y + 27) = 85$$

$$3x = 85 - (7y + 27)$$

$$3x = 85 - 7y - 27$$

$$3x = 58 - 7y$$

U kala saar e iyo tirooyinka (integer terms)
dhinaca LHS, ka jar labada dhinac, oo fududee
halka ay suurtagal tahay.

$$4d + 5e + 13 = 40$$

$$4d + (5e + 13) = 40$$

$$4d = 40 - (5e + 13)$$

$$4d = 40 - 5e - 13$$

$$4d = 27 - 5e$$

1) Buuxi meelaha bannaan ee dib-habayntan (rearrangements):

a) $j + k + 8 = 13$

$$j = 13 - (k \boxed{})$$

b) $j + k + 8 = 13$

$$k = 13 - (j \boxed{})$$

c) $7x + 8y + 9z = 10$

$$7x = 10 - (8y \boxed{})$$

d) $7x + 8y + 9z = 10$

$$9z = 10 - (7x \boxed{})$$

e) $3x^2 + 7y^3 - 4 = 10$

$$3x^2 = 10 - (7y^3 \boxed{})$$

f) $3x^2 - 7y^3 + 4 = 10$

$$3x^2 = 10 - (4 \boxed{})$$

2) Axmed aad buu u fiicnaa darsigan, laakiin wuxuu sameeyay qaar khaladaad ah. Calaamadee shaqadiisa dib-habaynta (rearranging) oo qor jumlad sharraxaysa khaladaadka aad aragtay.



a) $x + 3y + z = 7$

$$x = 7 - (3y + z)$$

c) $x + 3y + 5 = 7$

$$x = 7 - (3y + 5)$$

$$x = 7 - 3y + 5$$

$$x = 12 - 3y$$

b) $9x^3 - y^2 + 1 = 8$

$$9x^3 = 8 - (y^2 + 1)$$

d) $5d + 2e^3 - 4 = 10$

$$5d = 10 - (2e^3 - 4)$$

$$5d = 10 - 2e^3 + 4$$

$$5d = 14 - 2e^3$$

1) Buuxi meelaha bannaan ee dib-habayntan (rearrangements):

a) $j + k + 8 = 13$

$$j = 13 - (k + \boxed{})$$

b) $j + k + 8 = 13$

$$k = 13 - (j + \boxed{})$$

c) $7x + 8y + 9z = 10$

$$7x = 10 - (8y + \boxed{})$$

d) $7x + 8y + 9z = 10$

$$9z = 10 - (7x + \boxed{})$$

e) $3x^2 + 7y^3 - 4 = 10$

$$3x^2 = 10 - (7y^3 + \boxed{})$$

f) $3x^2 - 7y^3 + 4 = 10$

$$3x^2 = 10 - (4 - \boxed{})$$

2) Axmed aad buu u fiicnaa darsigan, laakiin wuxuu sameeyay qaar khaladaad ah. Calaamadee shaqadiisa dib-habaynta (rearranging) oo qor jumlad sharraxaysa khaladaadka aad aragtay.



a) $x + 3y + z = 7$

$$x = 7 - (3y + z) \checkmark$$

b) $9x^3 - y^2 + 1 = 8$

$$9x^3 = 8 - (y^2 + 1) \times$$

-y² iyo 1 waa in la kala saaraa ka hor inta aan la kala jarin.

$$9x^3 = 8 - (1 - y^2) \checkmark$$

2) Axmed aad buu u fiicnaa darsigan, laakiin wuxuu sameeyay qaar khaladaad ah. Calaamadee shaqadiisa dib-habaynta (rearranging) oo qor jumlad sharraxaysa khaladaadka aad aragtay.



c) $x + 3y + 5 = 7$

$x = 7 - (3y + 5)$ ✓

$x = 7 - 3y + 5$ ✗

$x = 12 - 3y$ ✗

$x = 7 - (3y + 5)$

$x = 7 - 3y - 5$

$x = 2 - 3y$ ✓

Waa inaan ka jarnaa labada erey ee ku dhex jira biraketada (brackets).

d) $5d + 2e^3 - 4 = 10$

$5d = 10 - (2e^3 - 4)$ ✓

$5d = 10 - 2e^3 + 4$ ✓

$5d = 14 - 2e^3$ ✓

Xiriirrada isku-darka (additive relationships) ee u dhexeeya doorsoomayaasha (variables) waxaa loo qori karaa siyaabo kala duwan.