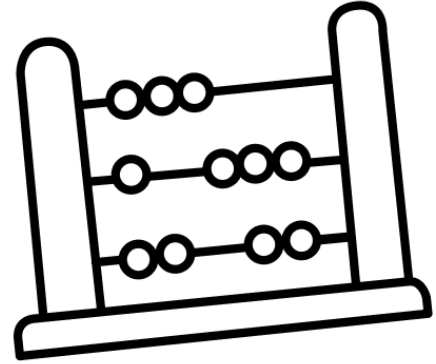


**Hubinta iyo xoojinta fahamka sharciga qaybinta
(distributive law) ee ereyada aljabrada (algebraic
terms)**



Maths

Cutub: Tibaaxaha iyo qaaciidooyinka (Expressions and formulae)

Natiijo

Waxaan isticmaali karaa sharciga qaybinta (distributive law) si aan ugu dhufto tibaax (expression) hal qayb (term).

Erayada muhiimka ah

Sharciga qaybinta (distributive law) wuxuu sheegayaa in ku dhufashada wadarta (sum) ay la mid tahay ku dhufashada mid kasta oo ka mid ah (addend) iyo isku darka natiijada.

Tusaalooyin
(Examples)

$$12 \times (4 + 3)$$

$$12 \times 7 = 84$$



$$12 \times (4 - 3)$$

$$12 \times (4 + (-3))$$

$$12 \times 1 = 12$$



Isticmaalka sharciga qaybinta
(distributive law)

$$12 \times (4 + 3)$$

$$48 + 36 = 84$$



Isticmaalka sharciga qaybinta
(distributive law)

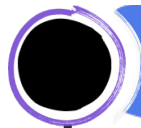
$$12 \times (4 + (-3))$$

$$48 + (-36) = 12$$



Qaabka casharka

Hubinta iyo xoojinta fahamka sharciga qaybinta (distributive law) ee ereyada aljabrada (algebraic terms)



Ku dhufashada tibaaxaha (expressions) hal qayb (term)



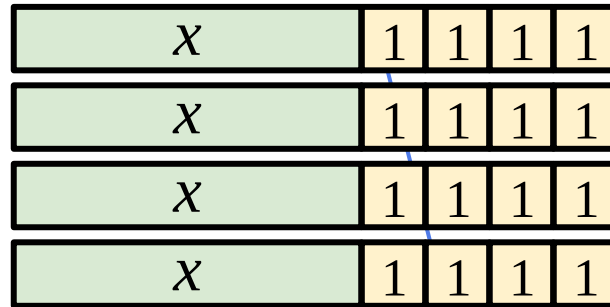
Ku dhufashada iyo fududaynta tibaaxaha badan (multiple expressions)

Waxaad ku dhufan kartaa tibaaxaha (expressions) oo ay ku jiraan ereyada aljabrada (algebraic terms).

Waxaad isticmaali kartaa ama sawiri kartaa algebra tiles si aad tan u sahamiso.



Tani waxay ka dhigan tahay in tibaaxa (expression) ku jira qawska (brackets) lagu dhufanayo 5.



Sidaa darteed, waxaan dhisi karnaa ama sawiri karnaa matalaad (representation) tibaaxda $x + 4$

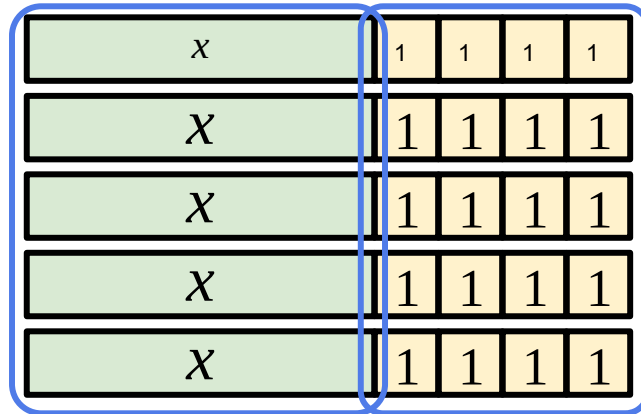


Waxaad sidoo kale ku dhufan kartaa tibaaxaha (expressions) oo ay ku jiraan ereyada aljabrada (algebraic terms).

Waxaad isticmaali kartaa ama sawiri kartaa algebra tiles si aad tan u sahamiso.

Tusaale (Example)

$$5(x + 4)$$

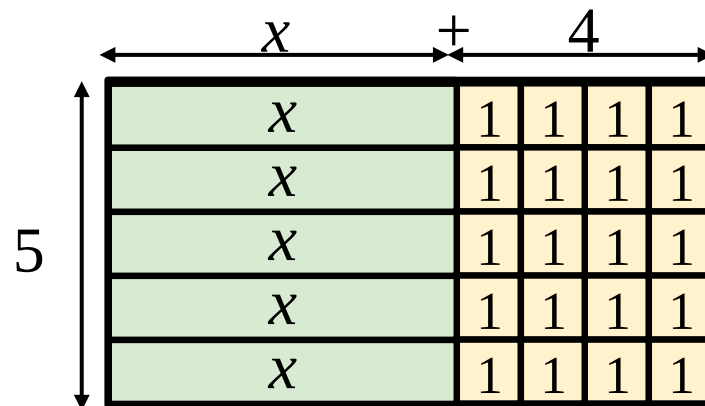
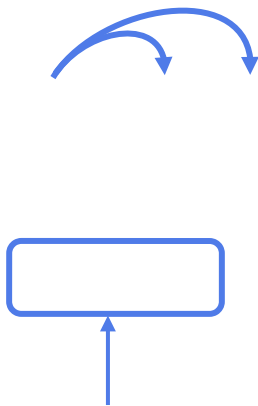


Maxay tani inoo tusinaysaa in $5(x + 4)$ u dhigma (equivalent)?

Isticmaalka sifada qaybinta (distributive property) ee ku dhufashada isugeynta (addition) waxay u dhigantaa:

Tusaale (Example)

$$5(x + 4)$$



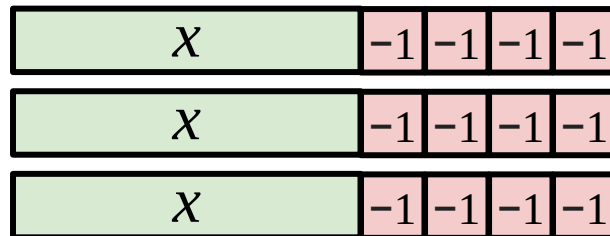
	x	$+$	4		
5	x	1	1	1	1
	x	1	1	1	1
	x	1	1	1	1
	x	1	1	1	1
	x	1	1	1	1

Marka aan u kala bixino qawska (brackets) sidan oo kale, waxaan ugu yeernaa natijada qaabka la fidiyay (expanded form) ee tibaaxaha (expression).

Ka digtoonow markaad ku dhufanayso erayada taban (negative terms).

Tiles-ka aljabrada (algebra tiles) waxay faa'iido u yeelan karaan in lagu qaabeeyo kuwan bilowga.

Waxaad dhisi kartaa tibaaxaha (expression) ku jira qawska (brackets), $x - 4$ oo la mid ah $x + (-4)$ oo samayn 3 nuqul (copies).



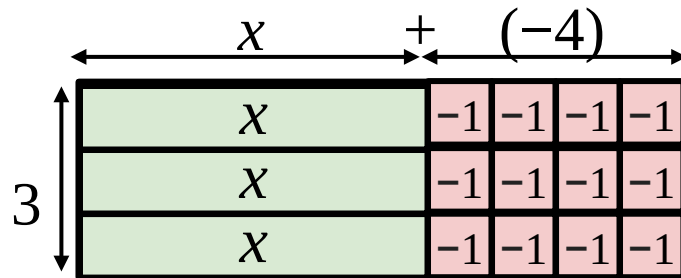
Marka $3(x - 4)$ waxay u dhigantaa $3x + (-12)$ ama $3x - 12$

Ka digtoonow markaad ku dhufanayso erayada taban (negative terms).

Tiles-ka aljabrada (algebra tiles) waxay faa'iido u yeelan karaan in lagu qaabeeyo kuwan bilowga.

Tusaale (Example)

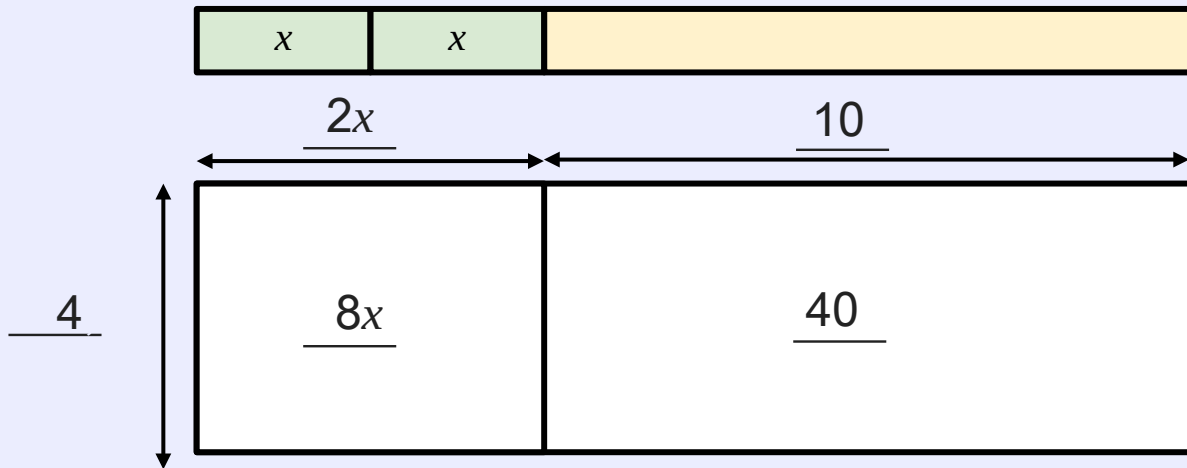
$$3(x - 4)$$



Ama isticmaal sifada qaybinta (distributive property) iyo qaabka bedka (area model) si aad u kala bixiso qawska (bracket).

Ku dhufashada tibaaxaha (expressions) eray (term)

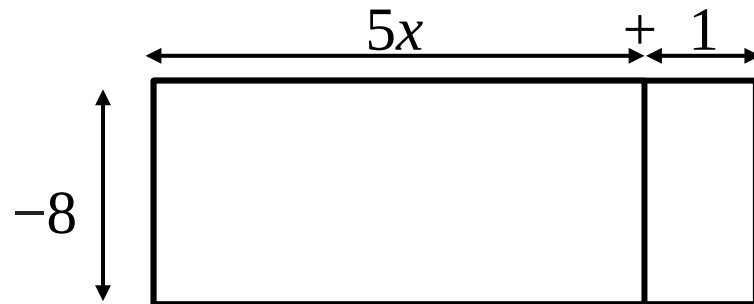
Dhammeystir qaabka bedka (area model) si aad u muujiso fidinta (expansion) ee $4(2x + 10)$



$$4(2x + 10) \equiv 8x + 40$$

Waxaan isticmaali karnaa isla habka marka tirada lagu dhufanayso (multiplier) ay tahay mid taban (negative).

Isticmaal xirfadahaaga tirooyinka taban (negative numbers) si ay kuu caawiyaan.



Sidee bay u ekaan doontaa qaabka la fidiyay ee $-8(5x - 1)$?



Caasha

Ku dhufashada tibaaxaha (expressions) hal xubin (term)

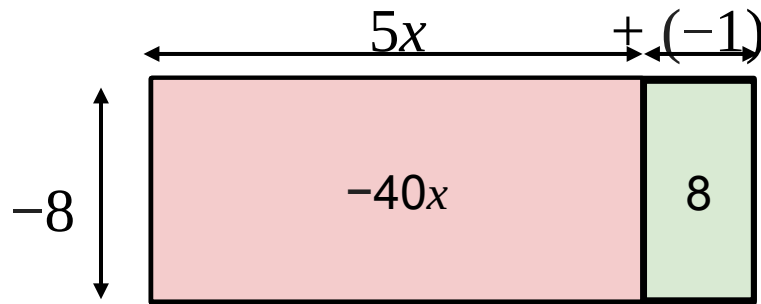
Ka fikir waxa dhacaya marka aan ku dhufano laba qiime (value) oo taban.

Sidee bay u ekaan doontaa qaabka la fidiyay ee $-8(5x - 1)$?

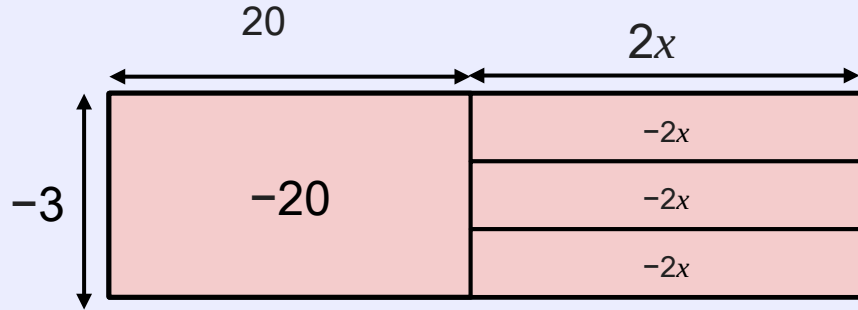
Caasha



$$\begin{aligned} -8(5x - 1) &\equiv -8 \times (5x - 1) \\ &\quad -8 \times 5x + -8 \times -1 \\ &\equiv -40x + 8 \end{aligned}$$



Caasha waxay isku dayday inay fidiso $-3(20 - 2x)$



$$-3(20 - 2x) \equiv -20 + -6x$$

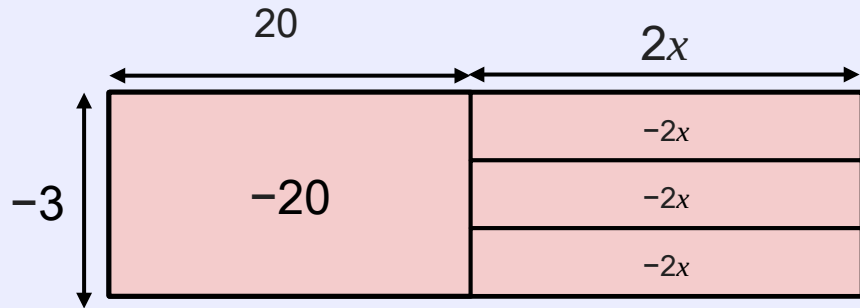
Caasha



Waa maxay khaladaadka ay samaysay?

Kaalay iyada si ay u hesho jawaabta saxda ah.

Caasha waxay isku dayday inay fidiso $-3(20 - 2x)$



$$-3(20 - 2x) \equiv -20 + -6x$$



Caasha

Waa maxay khaladaadka ay samaysay?

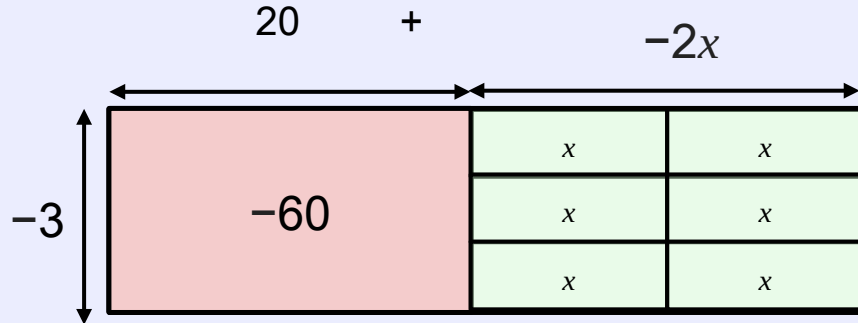
Iyadu kuma dhufsan 20×-3

Baarka sare waa inuu yiraahdaa $-2x$, ma aha $2x$. Qiime (value) taban oo lagu dhuftey qiime (value) taban wuxuu soo saari doonaa qiime (value) togan.

Caasha waxay isku dayday inay fidiso $-3(20 - 2x)$

Kaalay iyada si ay u hesho jawaabta saxda ah.

Caasha



$$-3(20 - 2x) \equiv -60 + 6x$$

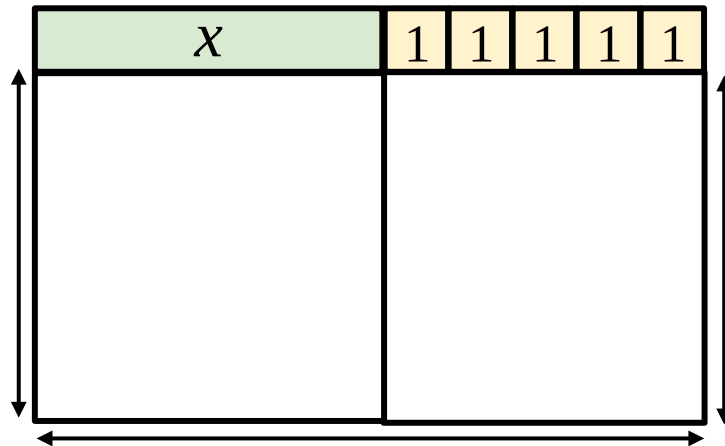
Qaabka bedka (area model) wuxuu kaloo kaa caawin karaa fahamka ku dhufashada hal doorsoome (variable). Tusaale ahaan, si loo fidiyo qawskaan $x(x + 5)$

Maadaama aynaan aqoonin qiimaha (value) x , ma samayn karno x nuqul oo nuqullo ah.



Qaabka bedka (area model) wuxuu kaloo kaa caawin karaa fahamka ku dhufashada doorsoomaha (variable). Tusaale, si loo furo qawska (bracket) $x(x + 5)$

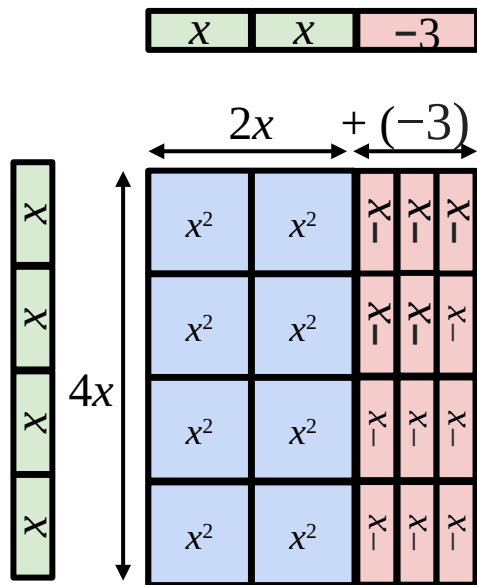
Si kastaba ha ahaatee, waxaan isticmaali karnaa qaabka bedka (area model) si aan u muujinno taranta (product) x iyo $(x + 5)$



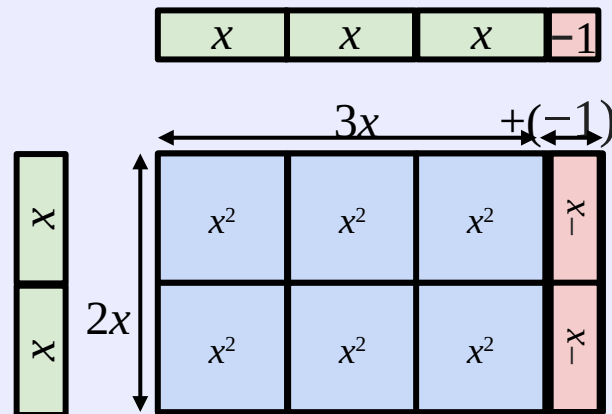
Wejiga (tiles) agagaarka geesaha leydigu (rectangle) waxay ahaayeen hagaha dhererka (lengths) aan ku dhufanaynay, mana qayb ka aha taranta (product), markaa waa laga saari karaa hadda.

Ku dhufashada tibaaxaha (expressions) eray (term)

Isticmaal qaabka bedka (area model) si aad u qorto $4x(2x - 3)$ qaabka la fiday (expanded form)

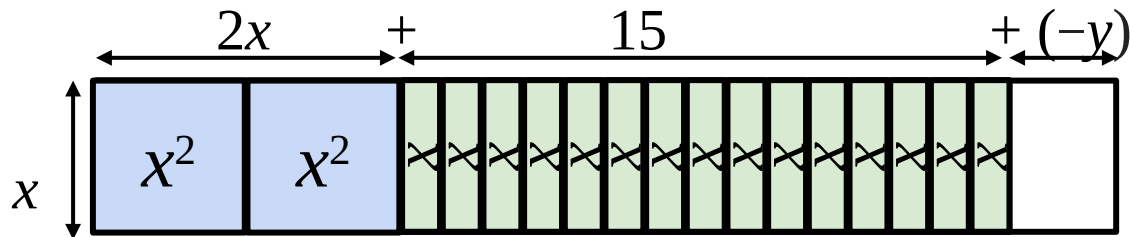


Isticmaal qaabka bedka (area model) si aad u qorto $2x(3x - 1)$ qaabka la fiday (expanded form)



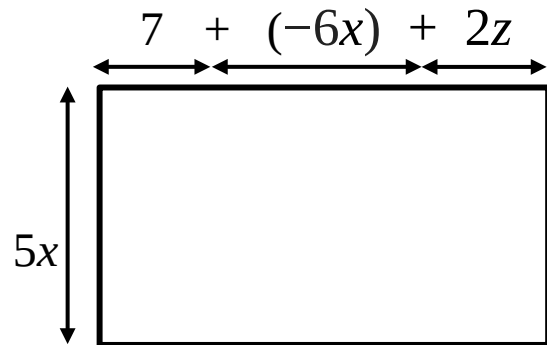
Tibaaxda (expression) ku jirta qawska (bracket) waxay ka koobnaan kartaa tiro kasta oo erayo (terms) ah.

$$x(2x + 15 - y)$$



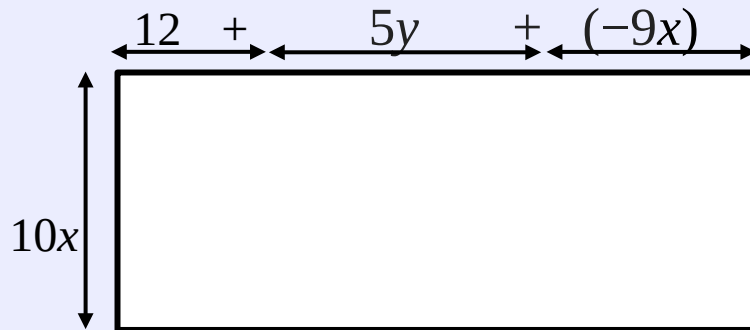
Ku dhufashada tibaaxaha (expressions) eray (term)

Isticmaal qaabka bedka (area model) si aad u qorto $5x(7 - 6x + 2z)$ qaabka la fiday (expanded form)



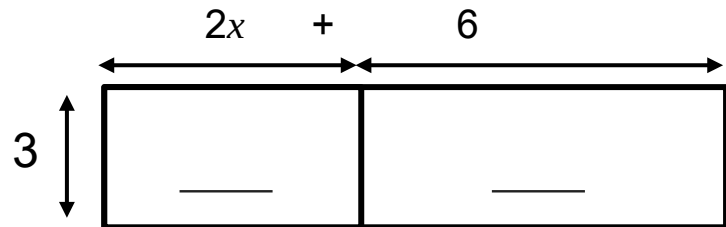
$$\begin{aligned} &5x(7 - 6x + 2z) \\ \equiv &5x \times 7 + 5x \times -6x + 5x \times 2z \end{aligned}$$

Isticmaal qaabka bedka (area model) si aad u qorto $10x(12 + 5y - 9x)$ qaabka la fiday (expanded form)

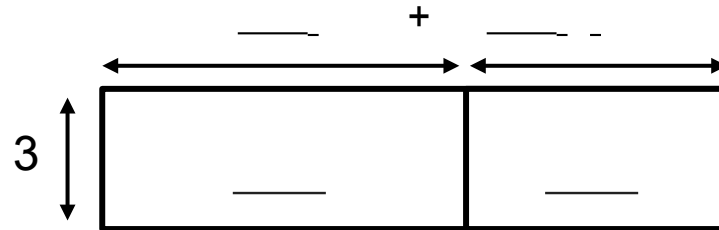


$$\begin{aligned} &10x(12 + 5y - 9x) \\ \equiv &10x \times 12 + 10x \times 5y + 10x \times -9x \end{aligned}$$

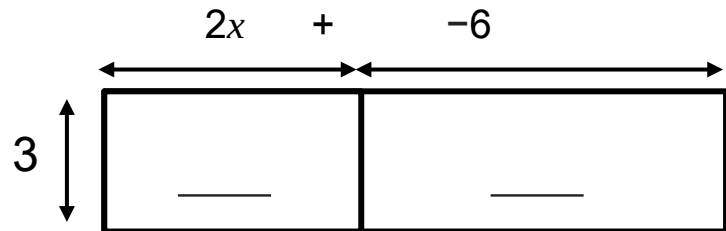
1) Isticmaal moodellada bedka (area models) si aad u qorto tibaaxahan qaab ballaaran (expanded form)



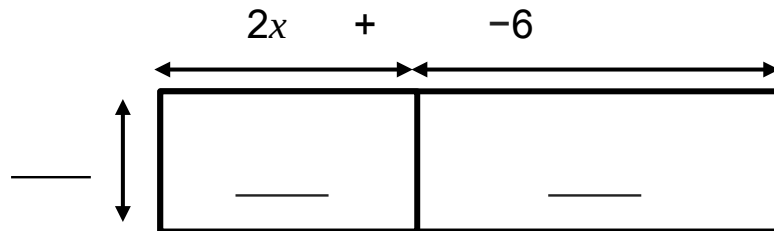
a) $3(2x + 6) \equiv$ _____



c) $3(6 - 2x) \equiv$ _____

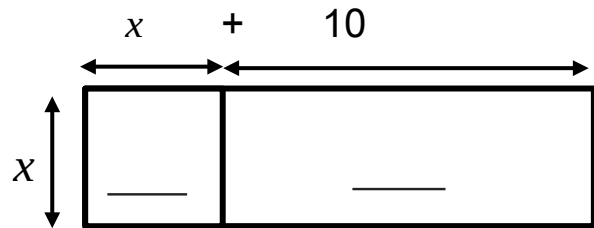


b) $3(2x - 6) \equiv$ _____

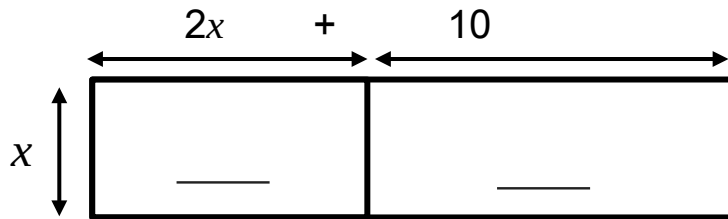


d) $-3(2x - 6) \equiv$ _____

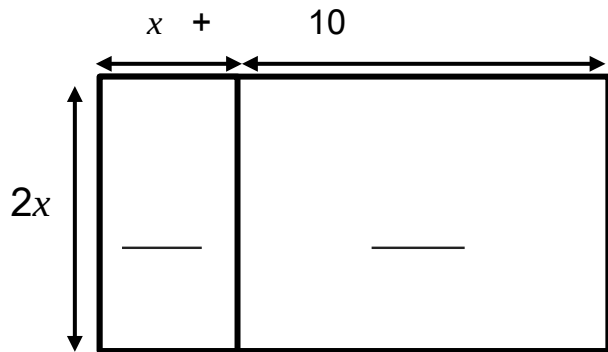
2) Isticmaal moodellada bedka (area models) si aad u qorto tibaaxahan qaab ballaaran (expanded form)



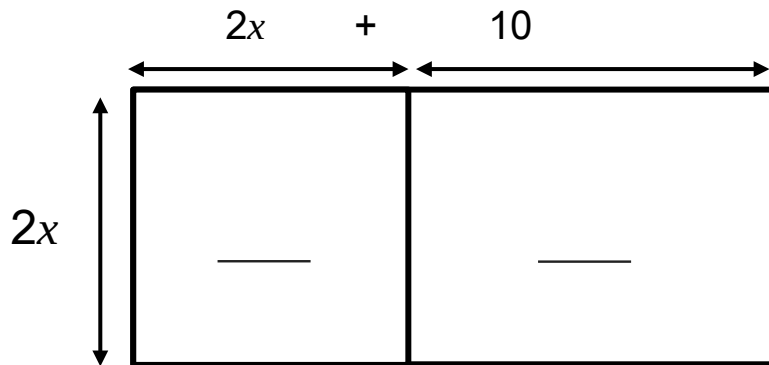
a) $x(x + 10) \equiv$ _____



c) $x(2x + 10) \equiv$ _____



b) $2x(x + 10) \equiv$ _____



d) $2x(2x + 10) \equiv$ _____

3) Qor mid kasta oo ka mid ah kuwan qaab ballaaran (expanded form).

a) $5(x + 4)$

b) $5(2x + 4)$

c) $5(2x - 4)$

d) $10(2x - 4)$

e) $10(4 - 2x)$

f) $10(-2x + 4)$

g) $-10(-2x + 4)$

h) $5x(x + 4)$

i) $5x(2x + 4)$

j) $5x(2 + 4x)$

k) $5x(2 - 4x)$

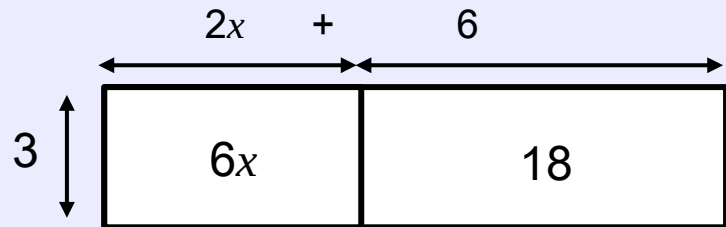
l) $-5x(2 - 4x)$

m) $-5x(2 - 4x + y)$

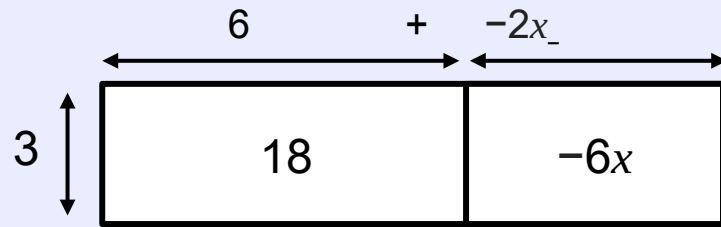
n) $-5x(2 - 4x) + y$



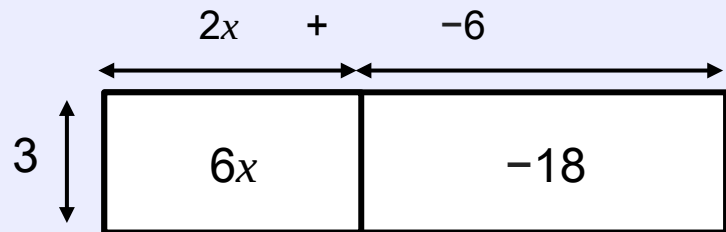
1) Isticmaal moodellada bedka (area models) si aad u qorto tibaaxahan qaab ballaaran (expanded form)



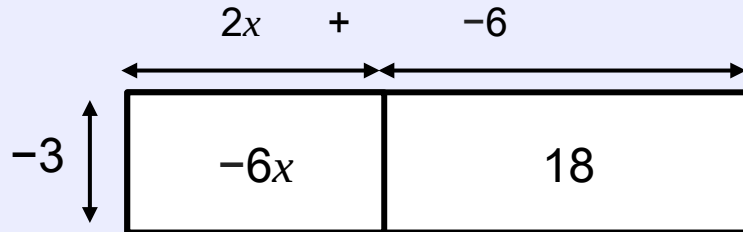
a) $3(2x + 6) \equiv 6x + 18$



c) $3(6 - 2x) \equiv 18 - 6x \equiv -6x + 18$

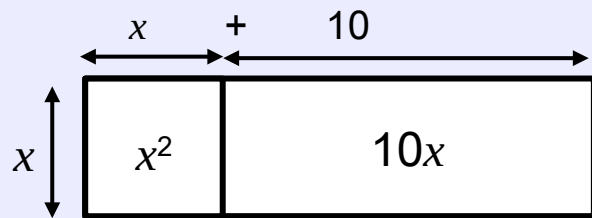


b) $3(2x - 6) \equiv 6x - 18$

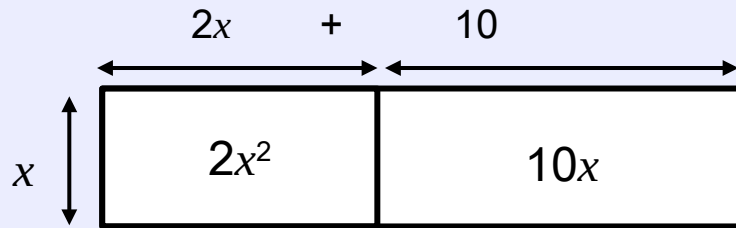


d) $-3(2x - 6) \equiv -6x + 18 \equiv 18 - 6x$

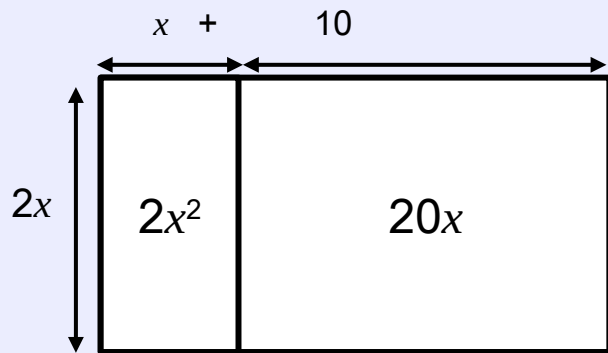
2) Isticmaal moodellada bedka (area models) si aad u qorto tibaaxahan qaab ballaaran (expanded form)



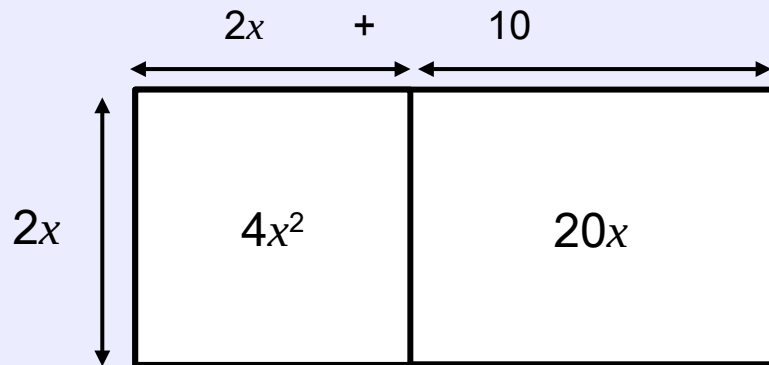
a) $x(x + 10) \equiv x^2 + 10x$



c) $x(2x + 10) \equiv 2x^2 + 10x$



b) $2x(x + 10) \equiv 2x^2 + 20x$



d) $2x(2x + 10) \equiv 4x^2 + 20x$

3) Qor mid kasta oo ka mid ah kuwan qaab ballaaran (expanded form).

a) $5(x + 4) \equiv 5x + 20$

b) $5(2x + 4) \equiv 10x + 20$

c) $5(2x - 4) \equiv 10x - 20$

d) $10(2x - 4) \equiv 20x - 40$

e) $10(4 - 2x) \equiv 40 - 20x$

f) $10(-2x + 4) \equiv 40 - 20x \equiv -20x + 40$

g) $-10(-2x + 4) \equiv 20x - 40$

h) $5x(x + 4) \equiv 5x^2 + 20x$

i) $5x(2x + 4) \equiv 10x^2 + 20x$

j) $5x(2 + 4x) \equiv 10x + 20x^2$

k) $5x(2 - 4x) \equiv 10x - 20x^2$

l) $-5x(2 - 4x) \equiv -10x + 20x^2$

m) $-5x(2 - 4x + y) \equiv -10x + 20x^2 - 5xy$

n) $-5x(2 - 4x) + y \equiv -10x + 20x^2 + y$

Qaabka casharka

Hubinta iyo xoojinta fahamka sharciga qaybinta (distributive law) ee xubnaha aljabrada (algebraic terms)



Ku dhufashada tibaaxaha (expressions) hal xubin (term)



Ku dhufashada iyo fududaynta tibaaxaha (expressions) badan

Waxaan ku fidin karnaa (expand) qawsyo (brackets) badan isla tibaax.

Tusaale ahaan $5(2x + 7) + 3(x - 3)$

$$5(2x + 7) + 3(x - 3)$$



Kooxi wada ereyada isku midka ah (like terms)



Fududee adigoo ku daraya ereyada isku midka ah (like terms)

Cali wuxuu doonayaa inuu u qoro tibaaxda (expression) $2x(5 - y) + 7y(x + 1)$ qaab ballaaran (expanded form)



Cali

Uma maleynayo inaan fududeyn karo tibaaxdan (expression) sababtoo ah ma jiri doonaan ereyo isku mid ah (like terms).

Markaan isku dhufano laba doorsoome (variables) waxaan u qornaa si xarfo ahaan u kala horreeya (alphabetical order) si ay u fududaato inaan aragno ereyada isku midka ah (like terms)



Cali waa khalad, waxaa jiray hal lammaane oo ereyo isku mid ah (like terms).

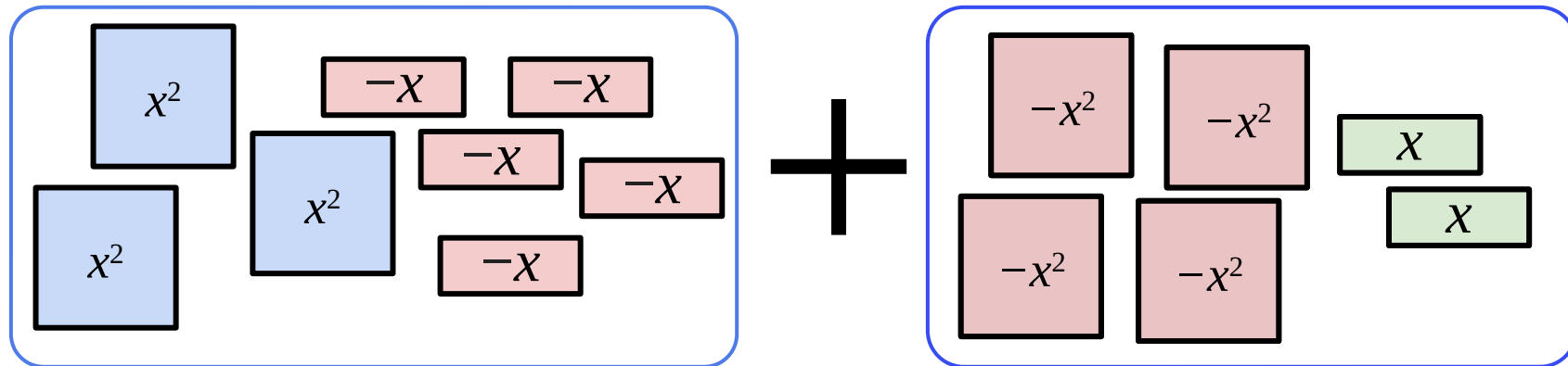
Isku dhufashada iyo fududeynta tibaaxo badan (multiple expressions)

Waxaan ballaarin karnaa (expand) tibaaxaha (expressions) oo leh hal tibaax qawsan (bracketed expression) laga jaray mid kale.

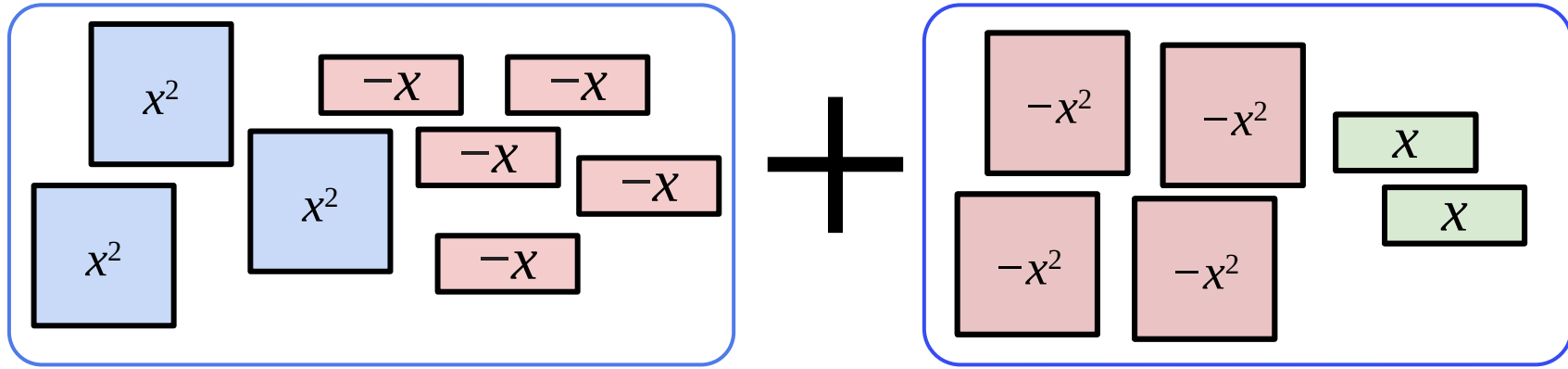
Tusaale ahaan $x(3x - 5) - 2x(2x - 1)$

Go'doominta qawska labaad (second bracket):

Tani waxay la mid tahay ku darista rogaal celinta isugeynta (additive inverse) ee tibaaxda (expression).



Isku dhufashada iyo fududeynta tibaaxo badan (multiple expressions)



$$\equiv 3x^2 - 5x - (4x^2 - 2x)$$

Ururinta ereyada isku midka ah (like terms),
iyo fududeynta, waxay naga tagaysaa $-x^2 - 3x$

Iyada oo aan lahayn tiles-ka waxaad u qori kartaa sidan:

Tusaale ahaan $x(3x - 5) - 2x(2x - 1)$



Fidinta (expanding) mid kasta si gooni ah, xusuusnow inaad ku dhufato $-2x$ kan labaad.

Ururinta ereyada la midka ah (like terms) iyo fududaynta, waxay nagu reebaysaa, $-x^2 - 3x$

Sharciga qaybinta (distributive law) waxaa lagu dabaqi karaa tibaax kasta oo qaws (bracket) ku jira.



Cali

Dhufashada labada tibaax
(expressions) jajab tobanle
(decimals) kala duwan waxay
qaadanaysaa waqti

Waxaan u malaynayaa
inaan arki karo hab fudud



Caasha

Maxaad u malaynaysaa in Caasha ay aragtay?

Labada qaws (brackets) waa isku mid marka waa la midayn karaa (unitised) waxaana lagu dari karaa isku dhufashada (multipliers). Tani waxay si gaar ah faa'iido u leedahay maadaama $4.6 + 5.4 = 10$

Dhufashada iyo fududaynta tibaaxaha (expressions) badan



Sababtoo ah qawsyada (brackets) waa isku mid waxaan u qori karnaa hal isku dhufasho (multiplier).

Dhufashada iyo fududaynta tibiaaxaha (expressions) badan



Arag qaladka (mistake) su'aal kasta:

a

Fidi $5(x + 6) + 7(x + 4)$

$$5x + 6 + 7x + 4$$

$$12x + 10$$

c

Fidi $-4(3x - 1) + 5(2 - x)$

$$-12x - 4 + 10 - 5x$$

$$-17x + 6$$

b

Fidi $2(3x + 8) - 5(x + 11)$

$$6x + 16 - 5x + 55$$

$$x + 71$$

d

Fidi $7(12 - 5x) - (12 - 5x)$

$$94 - 35x - 12 - 5x$$

$$82 - 40x$$

Ka day qaladka su'aasha kasta:

a

Balaadhi $5(x + 6) + 7(x + 4)$

$$5x + 6 + 7x + 4$$

$$12x + 10$$

Qawska (brackets) si sax ah looma balaadhin, eray kasta oo ku jira qawska waa in lagu dhufto erayga ka baxsan qawska.

b

Balaadhi $2(3x + 8) - 5(x + 11)$

$$6x + 16 - 5x + 55$$

$$x + 71$$

Dhammaan qawska labaad waa la kala goynayaa, markaa 55 waa in laga gooyaa 16, laguma darayo 16.

Ka day qaladka su'aasha kasta:

c

Balaadhi $-4(3x - 1) + 5(2 - x)$

$$\begin{aligned} & -12x - 4 + 10 - 5x \\ & -17x + 6 \end{aligned}$$

d

Balaadhi $7(12 - 5x) - (12 - 5x)$

$$\begin{aligned} & 84 - 35x - 12 - 5x \\ & 72 - 40x \end{aligned}$$

Dhammaan qawska labaad waa in la kala gooyaa. Kala goynta $5x$ taban (negative $5x$) waxay la mid tahay ku darista $5x$.

Labada qaws waa isku mid, markaa waxaa loo qori karaa $6(12 - 5x)$ ka hor balaadhinta.

1) Balaadhi oo fududee halkii ay suurtagal tahay.

a) $4(2x + 6) + 5(x + 2)$

b) $7(x - 5) + 2(x + 13)$

c) $x(2x + 1) + 6(5x - 3)$

d) $5x(3x + 7) - x(3x + 7)$

e) $4x(2y + 7) - 2(3x - 4)$

e) $3(4y + 7x) - 2(4y + 7x)$

e) $-5x(8y - 7x) - (yx - 10x)$

2) Afarta tibaaxood oo dhan waa isku mid (equivalent). Buuxi erayada maqan.

a) $5(2x - 3) + 4(2x + 5)$

b) $2(3x + 4) + 3(3x + \quad)$

c) $5(\quad - 1) - 5(x - 2)$

d) $7(3x \pm 1) - \quad (3x + 1)$



1) Balaadhi oo fududee halkii ay suurtagal tahay.

a) $4(2x + 6) + 5(x + 2)$

$$8x + 24 + 5x + 10$$

b) $7(x - 5) + 2(x + 13)$

$$7x - 35 + 2x + 26$$

c) $4(2x - 9) + 6(5x - 3)$

d) $5x(3x + 7) + 18(3x + 7)$

$$15x^2 + 35x - 3x^2 - 7x$$

$$12x^2 + 28x$$

e) $4x(2y + 7) - 2(3x - 4)$

$$8xy + 28x - 6x + 8$$

$$8xy + 22x + 8$$

.

e) $3(4y + 7x) - 2(4y + 7x)$

$$4y + 7x$$

e) $-5x(8y - 7x) - (yx - 10x)$

$$-40xy + 35x^2 - yx - (-10x)$$

$$-40xy + 35x^2 - yx + 10x$$

$$35x^2 - 41xy + 10x$$

2) Afartaan tibaaxood oo dhami waa isku mid (equivalent). Buuxi xubnaha maqan.

a) $7(x - 3) + 4(2x + 6.5)$

b) $2(3x + 4) + 3(3x + \quad)$

c) $5(\quad - 1) - 5(x - 2)$

d) $7(3x + 1) - \quad (3x + 1)$



Soo koobid

Hubinta iyo xoojinta fahamka sharciga qaybinta (distributive law) ee xubnaha aljabrada (algebraic terms)

Waxaan u isticmaali karnaa moodellada aagga (area models) si aan u muujinno sida sharciga qaybinta (distributive law) u shaqeeyo.

Markaad ku dhufanayso xubin (term) tibaax (expression) Tusaale: $5x(x + 2)$ waa in xubin kasta oo ku jirta qawska (bracket) lagu dhufteeyo xubinta ka baxsan qawska.


$$5x (x + 2) \equiv 5x^2 + 10x$$

Tibaaxda ku jirta qawska waxay ka koobnaan kartaa tiro xubnood (terms) ah.

Marka tibaaxdu ka kooban tahay qawsyo badan (brackets) waa la fidi karaa (expand) waxaana la isku dari karaa xubnaha isku midka ah (like terms) si loo fududeeyo tibaaxda.