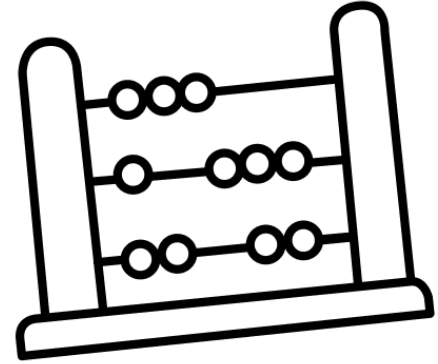


**Xallinta dhibaatooyinka iyadoo la adeegsanayo tibaaxaha (expressions)
iyo qaaciidooyinka (formulae)**



Maths

Cutub: Tibaaxaha (expressions) iyo qaaciidooyinka (formulae)

Natiijo

Waxaan u isticmaali karaa aqoontayda tibaaxaha (expressions) iyo qaaciidooyinka (formulae) si aan u xalliyo dhibaatooyin.

Erayada muhiimka ah

Binomial waa tibaax aljabreed (algebraic expression) oo ka dhigan wadarta laba eray oo aan isku mid ahayn.

Tusaalooyin

$$x + 2$$

$$5 - 6x$$

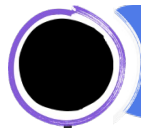
$$x^2 - x$$

$$a + 2y$$

Qaab isku dhafan (compound shape) waa qaab laga sameeyay laba qaab oo aasaasi ah ama in ka badan.

Qaabka casharka

Xallinta dhibaatooyinka iyadoo la adeegsanayo tibaaxaha (expressions) iyo qaaciidooyinka (formulae)



Sameynta tibaaxaha (expressions) ee bedka (area)



Bedka (area) qaababka isku dhafan (compound shapes)

Waxaan u isticmaali karnaa taranta (product) laba binomial si aan u qorno tibiaaxaha (expressions) bedka (area) qaababka ay dhererka dhinacyadoodu yihiin tibaaxo binomial.



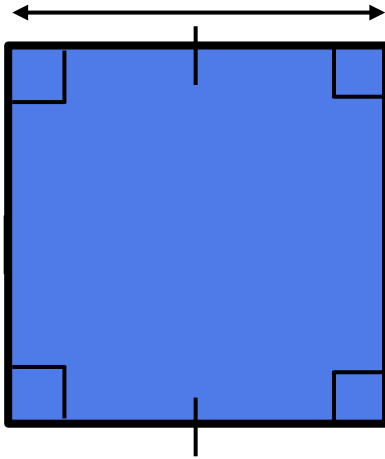
Sideen u qori karnaa tibaax (expression) bedka (area) qaabkan?

bedka (area) = ballaca (width) $\times$
dhererka (length)

Waxaan heli karnaa tibaax u dhigma (equivalent expression) adoo balaadhinaya (expanding).

Sideen u qori karnaa tibaax (expression) bedka (area) qaabkan?

Kani waa laba jibaaran (square) marka bedka (area) waxaa loo qori karaa $(3x + 2)^2$



Dhammaan kuwani waa tibaaxo (expressions) bedka (area) qaabkan, laakiin qaabab kala duwan.

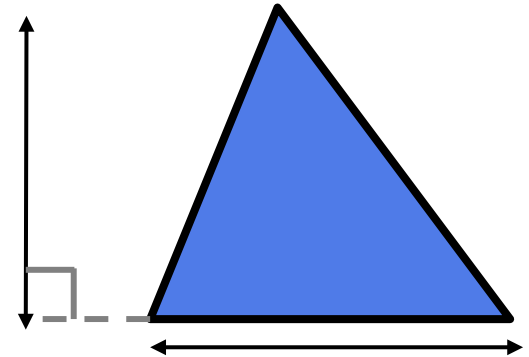
Sameynta tibaaxaha (expressions) ee bedka (area)

Waxaan sidaas oo kale u samayn karnaa qaab kasta, haddii aan haysanno tibaax (expression) dhammaan cabbirada loo baahan yahay si loo xisaabiyo bedka (area).

Bedka (area) saddexagalka waxaa lagu xisaabin karaa isku dhufashada salka (base) dhererka toosan (perpendicular height), ka dibna u qaybinta 2.

$$\text{bed} = \frac{1}{2} \times \text{salka} \times \text{dhererka toosan} \quad (\text{area} = \frac{1}{2} \times \text{base} \times \text{height})$$

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



Samaynta tibaaxaha (expressions) bedka (area)

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

Sidee kale ayaan u qori karnaa tan?

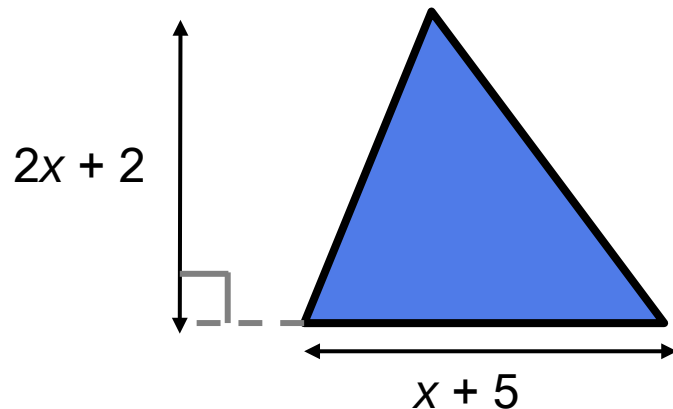
Waxaan ku dhufan karnaa binomials-ka (binomials) ka dibna hel karnaa badh (half) sheygaas (product).

$$\equiv \frac{1}{2} (2x^2 + 2x + 10x + 10)$$

$$\equiv \frac{1}{2} (2x^2 + 12x + 10)$$

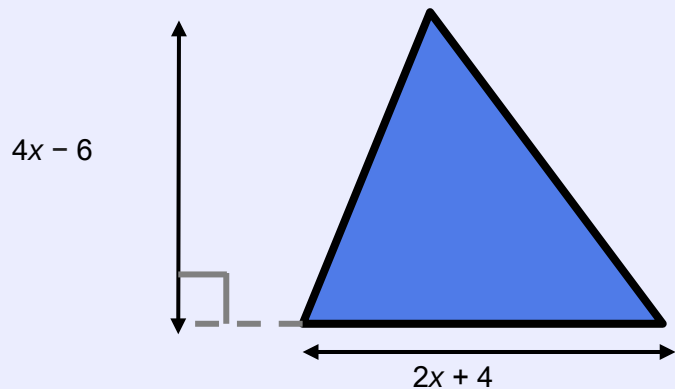
Si loo badh (half) qaybta (expression) oo dhan, waxaan ku dhufan karnaa eray kasta (term)

$$\frac{1}{2}$$



Samaynta tibaaxaha (expressions) bedka (area)

Kuwee ka mid ah kuwani waxay noqon karaan tibaaxaha (expressions) bedka (area) saddex-xagalkan (triangle)?



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

$$(x + 2)(4x - 6)$$

$$(x + 4)(2x - 6)$$

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

$$(2x + 4)(2x - 6)$$

$$(2x + 4)(4x - 6)$$

Qiimahan (value) waa inuu ahaadaa 4

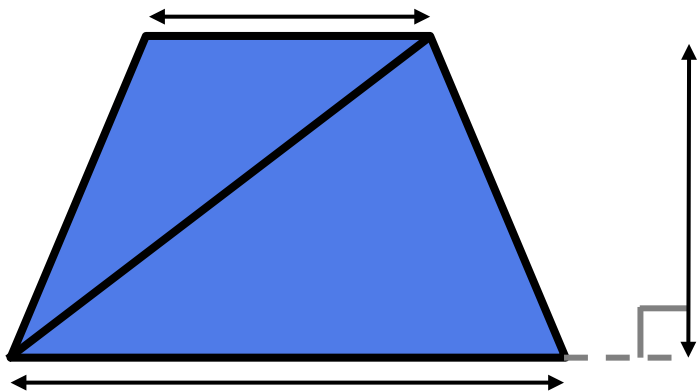
$$\frac{1}{2}(4x - 6)(2x + 2)$$

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

Samaynta tibaaxaha (expressions) bedka (area)

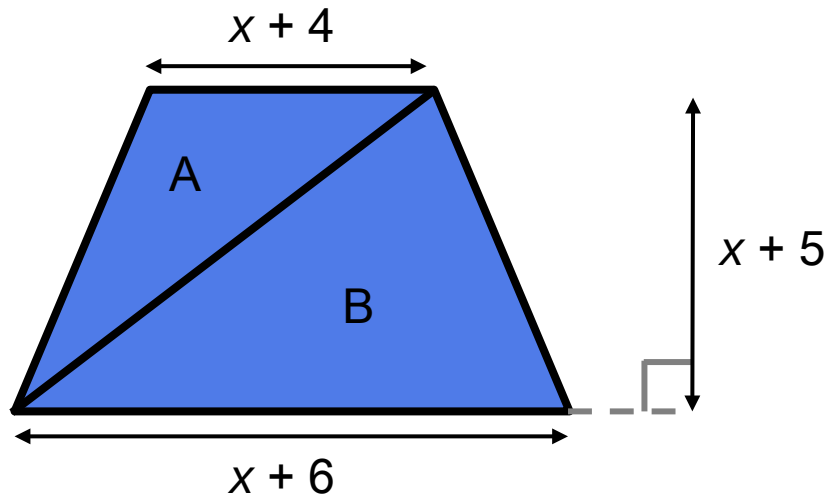
Waa kan trapezium (trapezium).

Si loo xisaabiyo tibaax (expression) fudud (simplified) bedka (area) waxaan u kala qaybin karnaa laba saddex-xagal (triangle).



$$\frac{1}{2}x^2 + \frac{9}{2}x + 10$$
$$\frac{1}{2}x^2 + \frac{11}{2}x + 15$$

Samaynta tibaaxaha (expressions) bedka (area)



Bedka A (Area of A): $(x + 4)(x + 5)$

$$\frac{1}{2} (x^2 + 9x + 20)$$

$$\frac{1}{2}x^2 + \frac{9}{2}x + 10$$

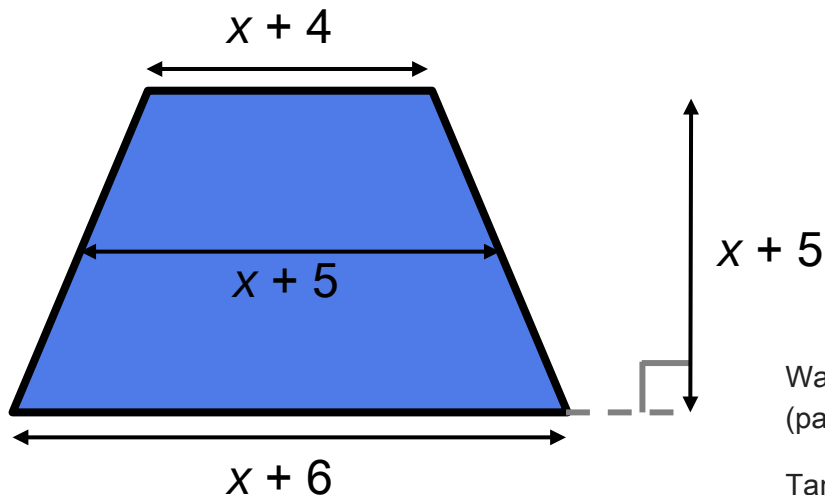
Bedka B (Area of B): $(x + 6)(x + 5)$

$$\frac{1}{2} (x^2 + 11x + 30)$$

$$\frac{1}{2}x^2 + \frac{11}{2}x + 15$$

Wadarta (Total): $\frac{1}{2}x^2 + \frac{9}{2}x + 10 + \frac{1}{2}x^2 + \frac{11}{2}x + 15$

$$x^2 + 10x + 25$$



Waxaan u malaynayaa inaan ogahay hab ka fudud oo aan ku helo bedka (area) trapezium-ka (trapezium)



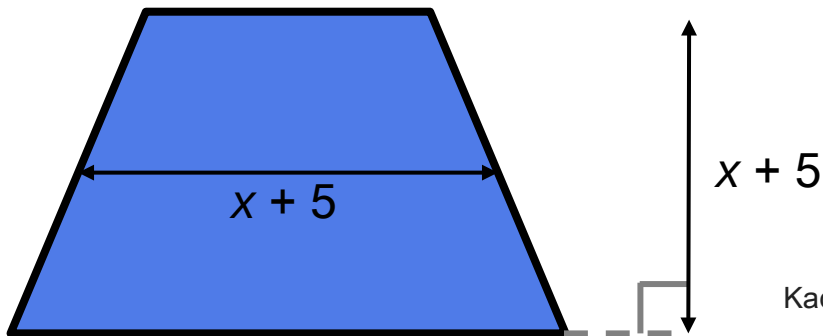
Caasha

Waxaan ku bilaabi karnaa inaan isku darka dhinacyada isbarbar socda (parallel sides) kuna qaybino 2

Tani waxay helayasaa dhexda labada dherer (lengths).

$$x + 4 + x + 6 \equiv 2x + 10$$

$$\frac{2x + 10}{2} \equiv x + 5$$



Waxaan u malaynayaa inaan ogahay
hab fudud oo lagu helo bedka (area)
trapezium-ka



Caasha

Kadibna waxaan ku dhufan karnaa dhererka (height).

$$\equiv (x + 5)(x + 5)$$

$$\equiv x^2 + 10x + 25$$

Caasha waxay isticmaashay qaacidada (formula) bedka (area) trapezium-ka:

Halka a iyo b ay yihiin dhinacyada isbarbar socda (parallel sides).

$$A = \frac{1}{2}(a + b)h$$

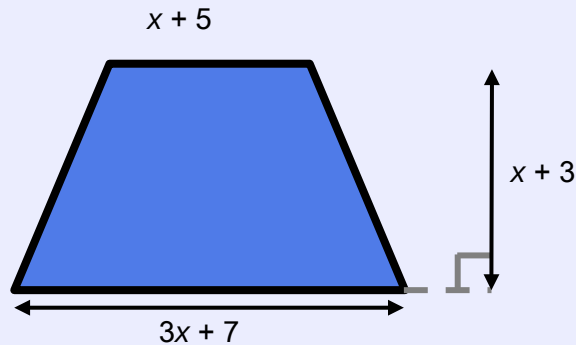
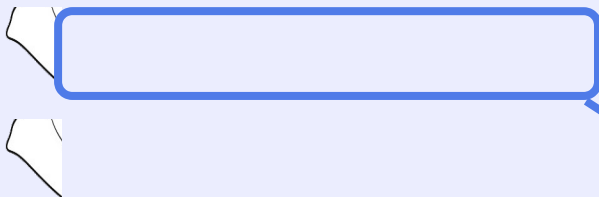
Layla waxay rabtaa tibaax (expression) fudud oo loogu talagalay bedka (area) trapezium-kan.

Waxay isticmaashaa qaacidada (formula) (halka a iyo b ay yihiin dhinacyada isbarbar socda (parallel sides).)

$$A = \frac{1}{2}(a + b)h$$



Layla



Waxay isticmaashay cabbiro (dimensions) khaldan. Waa inay ku dartaa dhinacyada isbarbar socda (parallel sides) oo ku dhufataa dhererka toosan (perpendicular height).

Layla waxay rabtaa tibaax (expression) fudud oo loogu talagalay bedka (area) trapezium-kan.

Waxay isticmaashaa qaacidada (formula) $A = \frac{1}{2}(a + b)h$



Layla

Mar kale ayaan isku dayi doonaa.

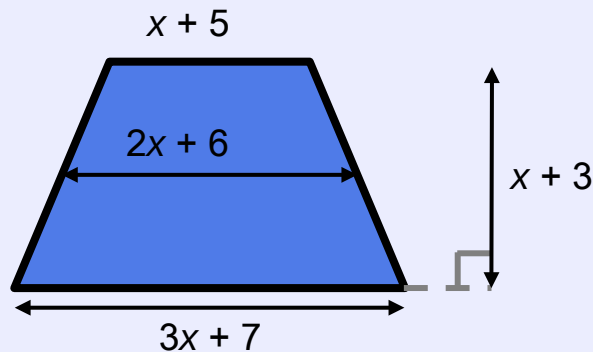
$$\frac{1}{2} (x + 5 + 3x + 7)(x + 3)$$

$$(4x + 12)(x + 3)$$

$$(2x + 6)(x + 3)$$

$$2x^2 + 6x + 6x + 18$$

$$2x^2 + 12x + 18$$

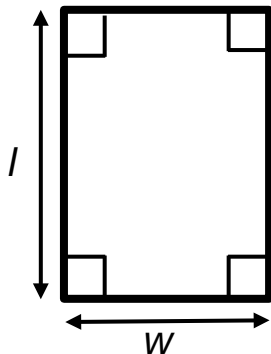


Taas ayaan iyana helay.

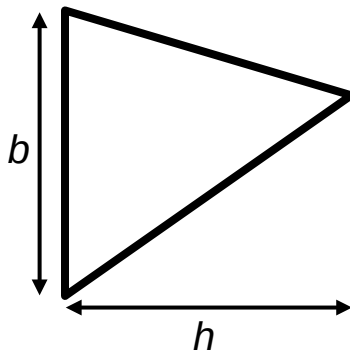
Caasha



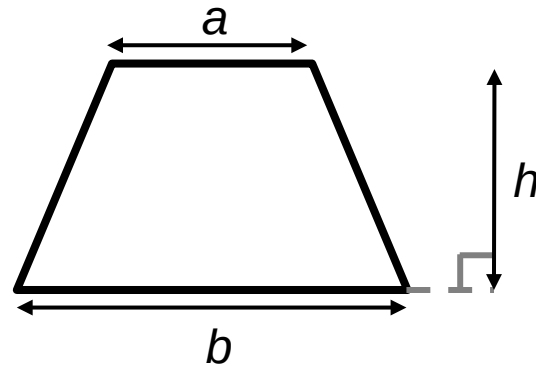
Waa kuwan qaar ka mid ah qaaciidooyinka (formula) bedka (area) qaababka 2D (2D shapes) oo kaa caawin kara hawsha soo socota.



bed (area) = ballac (width) $\times$ dherer (length)



bed (area) = $\frac{1}{2}$ sal (base) $\times$ joog (height)



bed (area) = $\frac{1}{2} \times (a + b) \times h$

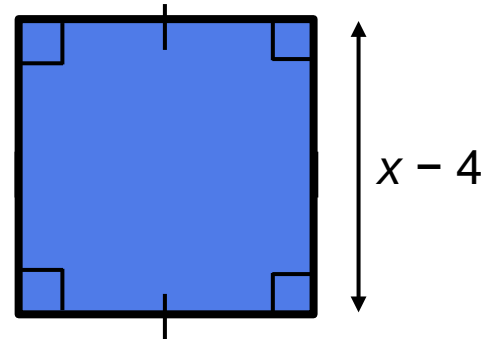
Halka a iyo b ay yihiin dhinacyada isbarbar socda (parallel sides).

1) Qor jumlad sharraxaysa sababta bedka (area) qaabkan loo qori karo siyaabaha soo socda mid kasta:

a) $(x - 4)^2$

b) $(x - 4)(x - 4)$

c) $x^2 - 8x + 16$

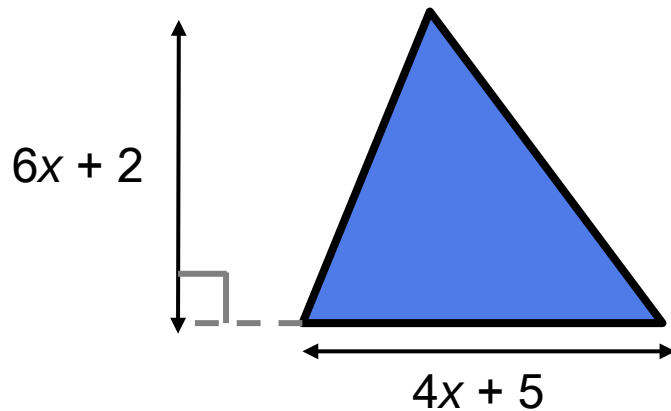


2) Sawir leydi (rectangle) leh bed (area) $(6 + y)(2 + y)$ qor tibaax (expression) ka duwan oo bedka (area) leydigaaga ah.

3a) Sharrax sababta bedka (area) qaabkan loo qori karo sida

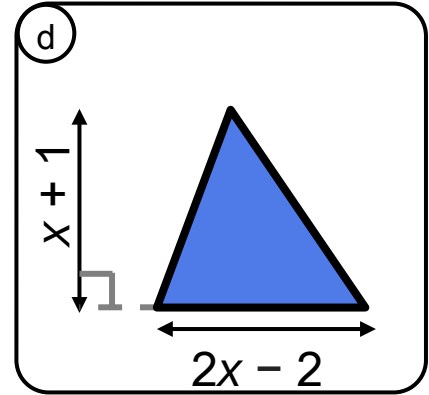
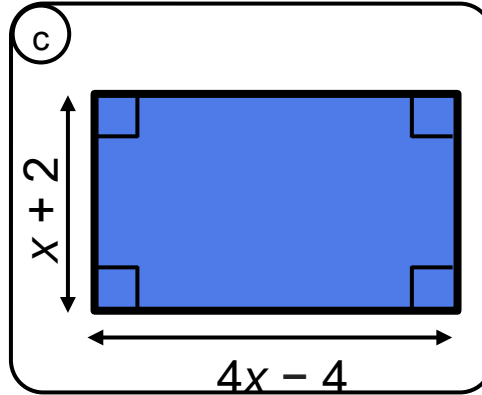
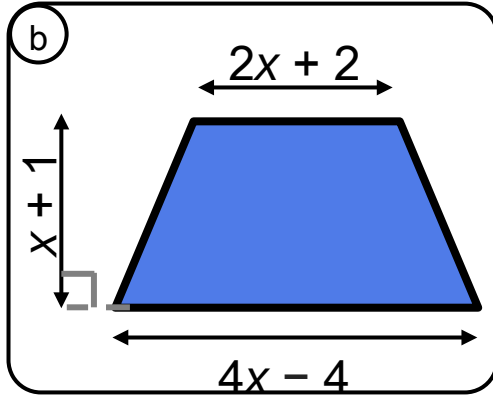
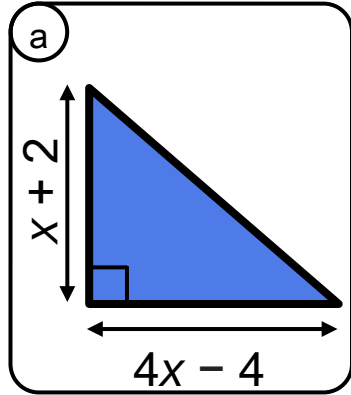
$$\frac{1}{2} (4x + 5)(6x + 2)$$

b) Qor tibaaxda (expression) bedka (area) qaabkan laba siyaabood oo kala duwan.



c) Sawir oo calaamadee saddex-xagal (triangle) leh bed (area) $(x + 1)(3x - 2)$

4) Isku-dhaf qaababkan iyo tibaaxda (expression) saxda ah ee bedkooda (area).



e $x^2 - 1$

f $2x^2 + 2x - 4$

g $3x^2 + 2x - 1$

h $4x^2 + 4x - 8$

1) Qor jumlad sharraxaysa sababta bedka (area) qaabkan loo qori karo siyaabaha soo socda mid kasta:

a) $(x - 4)^2$

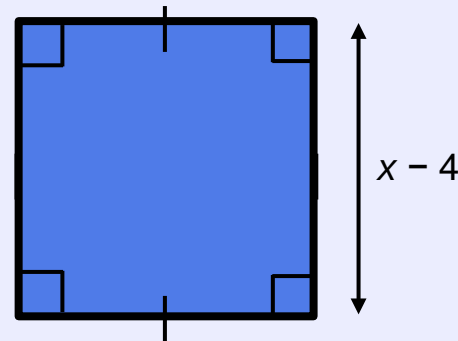
Qaabku waa laba-jibaarane (square) marka bedka (area) waxaa laga heli karaa isku-dhufashada dhererka hal dhinac (side length).

b) $(x - 4)(x - 4)$

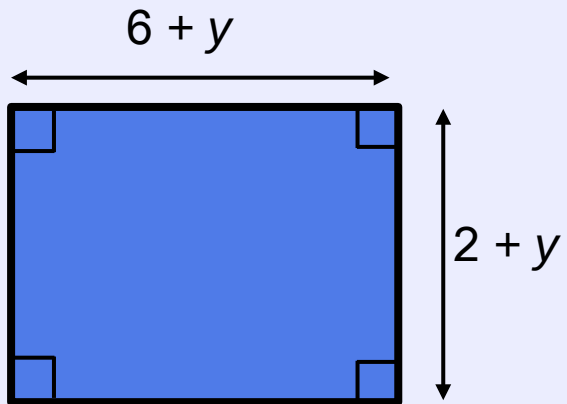
Laba-jibaarista (squaring) tibaax (expression) waxay la mid tahay isku-dhufashada tibaaxdaas naftaada. $(x - 4)^2 \equiv (x - 4)(x - 4)$

c) $x^2 - 8x + 16$

Waxaan isku-dhufan karnaa laba-xubnaha (binomials) iyadoo la adeegsanayo sharciga qaybinta (distributive law): $(x - 4)(x - 4) \equiv x(x - 4) - 4(x - 4) \equiv x^2 - 4x - 4x + 16 \equiv x^2 - 8x + 16$



2) Sawir leydi (rectangle) leh bed (area) $(6 + y)(2 + y)$ qor tibaax (expression) ka duwan oo bedka (area) leydigaaga ah.



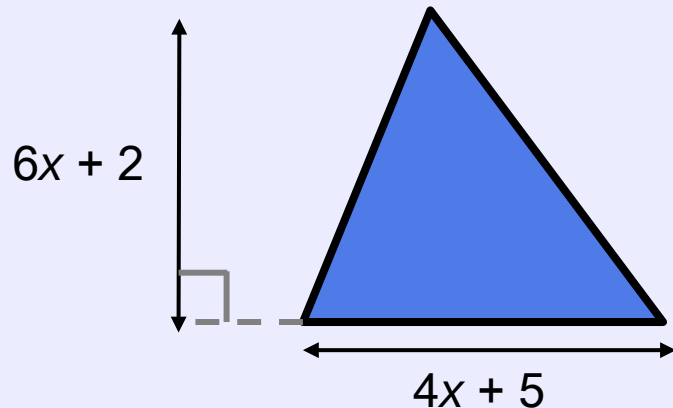
$(y + 6)(y + 2)$ ama laba-xubno (binomials) u dhigma (equivalent).

$$y^2 + 2y + 6y + 12$$

$$y^2 + 8y + 12$$

3a) Sharax sababta bedka (area) qaabkan loo qori karo $\frac{1}{2} (4x + 5)(6x + 2)$

Bedka (area) saddexagalka waxaa lagu xisaabin karaa isku dhufashada salka (base) dhererka (height) iyo isku dhufashada nus.



b) Qor tibaaxa (expression) bedka (area) qaabkan laba siyaabood oo kala duwan.

E.g. $(4x + 5)(3x + 1)$

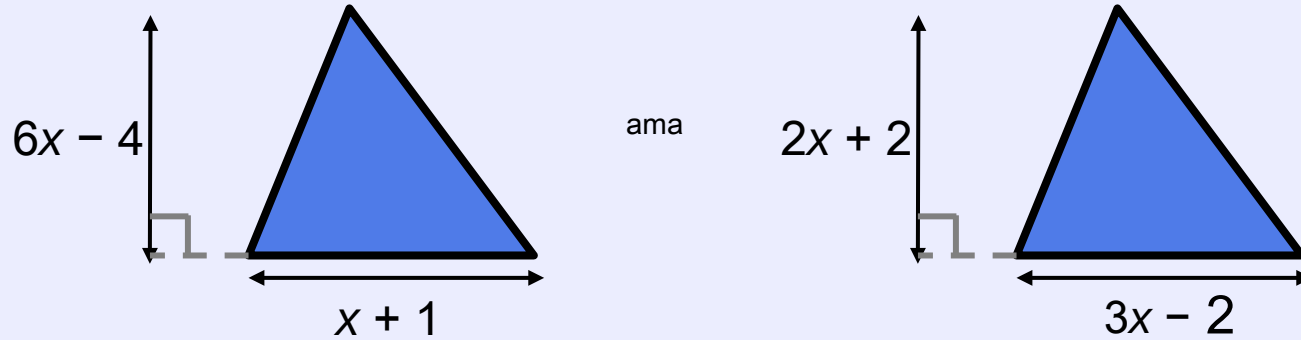
$$12x^2 + 4x + 15x + 5$$

$$12x^2 + 19x + 5$$

$$(2x + 2.5)(6x + 2)$$

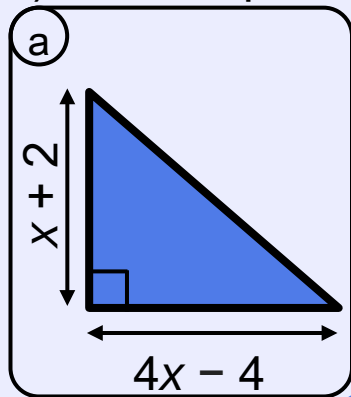
$$\frac{(4x + 5)(6x + 2)}{2}$$

c) Sawir oo calaamadee saddexagal leh bed (area) $(x + 1)(3x - 2)$

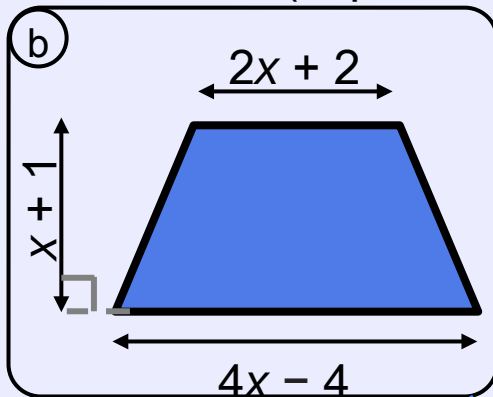


Binomials-ka (binomials) waxay ku yaalliin cabbir kasta.

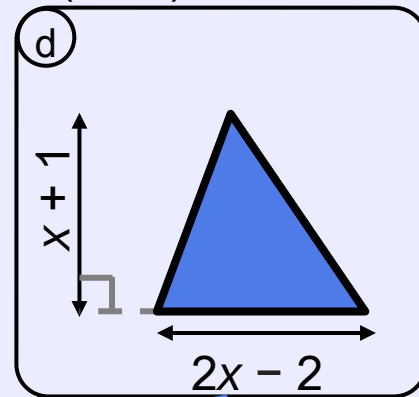
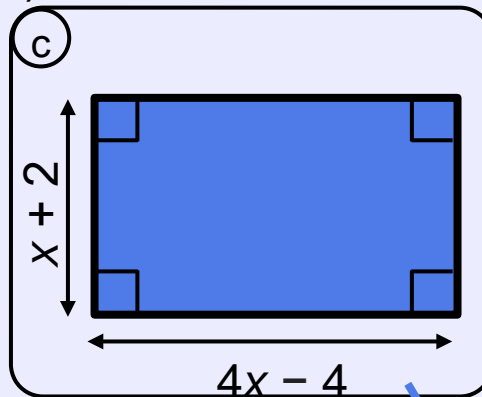
4) Isku xir qaababkan tibaaxa (expression) saxda ah ee bedkooda (area).



$\frac{1}{2}$



$\frac{1}{2}$



$\frac{1}{2}$

(e) $x^2 - 1$

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

(g) $3x^2 + 2x - 1$

(h) $4x^2 + 4x - 8$

Qaabka casharka

Xallinta mashaakilaadka (problem solving) iyadoo la adeegsanayo tibaaxaha (expressions)
iyo qaaciidooyinka (formulae)



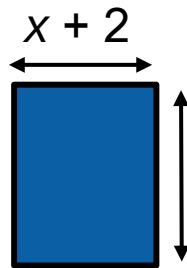
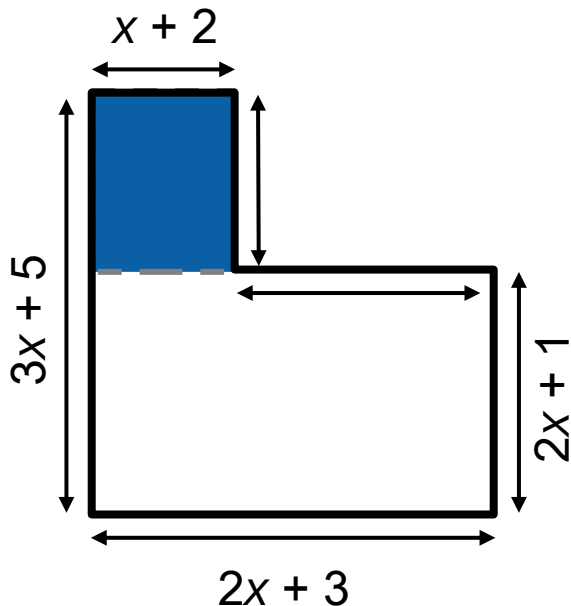
Sameynta tibaaxaha (expressions) ee bedka (area)



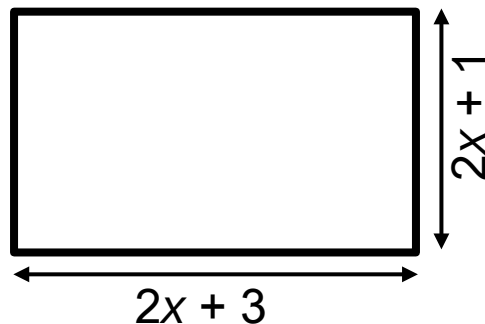
Bedka (area) qaababka isku dhafan (compound shapes)

Bedka (area) qaababka isku dhafan (compound shapes)

Bedka (area) qaababka isku dhafan (compound shapes) waxaa lagu heli karaa iyadoo loo kala qaybiyo qaababka bedkooda (area) la heli karo.

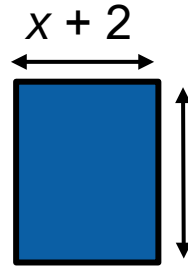
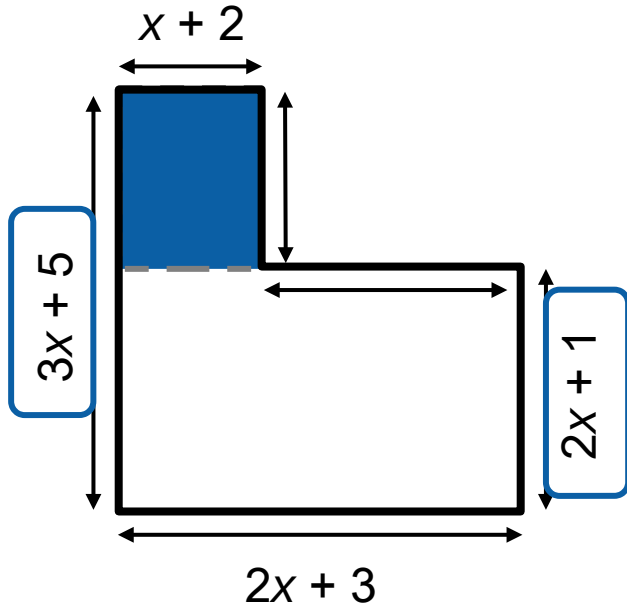


Waxaan u baahanahay inaan helno dhererka (length) maqan ee leydi yar marka hore.

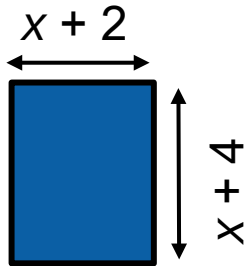


Bedka (area) qaababka isku dhafan (compound shapes)

Bedka (area) qaababka isku dhafan (compound shapes) waxaa lagu heli karaa iyadoo loo kala qaybiyo qaababka bedkooda (area) la heli karo.



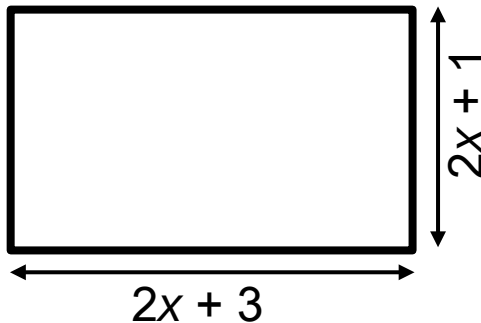
Hadda waxaan u xisaabin karnaa tibaaxaha (expressions) labada bed (area).



$$(x + 2)(x + 4)$$

$$x^2 + 4x + 2x + 8$$

$$x^2 + 6x + 8$$



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

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

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

Waan ogahay hab kale oo
aan ku sameeyo!

Axmed



Wadarta bedka (area):

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

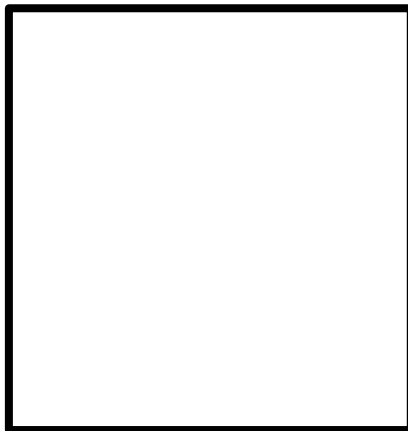
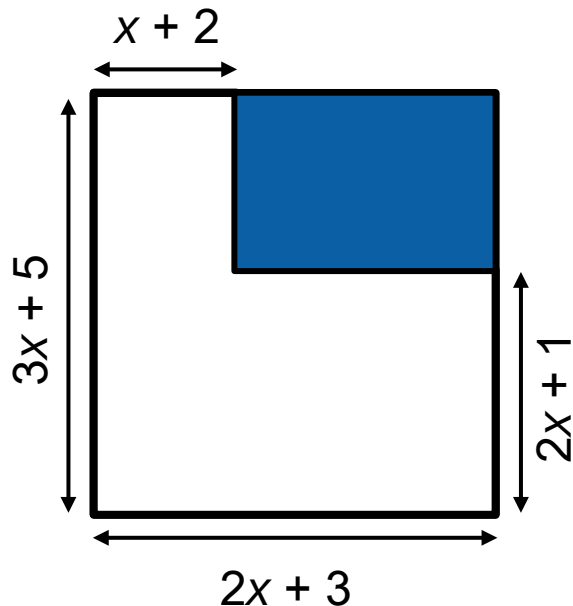
$$5x^2 + 14x + 11$$

Xisaabinta aan samaynay waa:

$$(x + 2)(x + 4) + (2x + 3)(2x + 1) \equiv 5x^2 + 14x + 11$$

Bedka qaababka isku dhafan (Area of compound shapes)

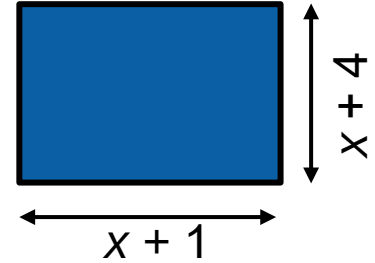
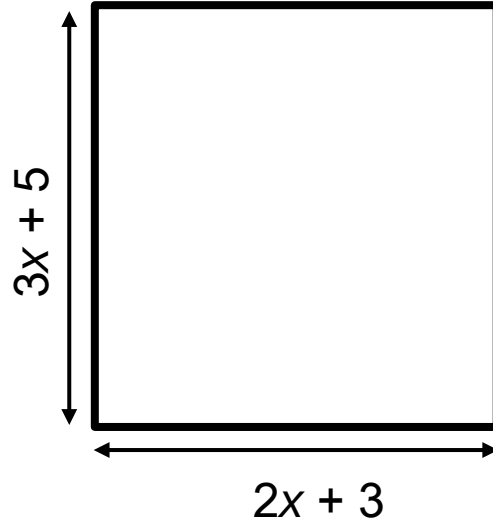
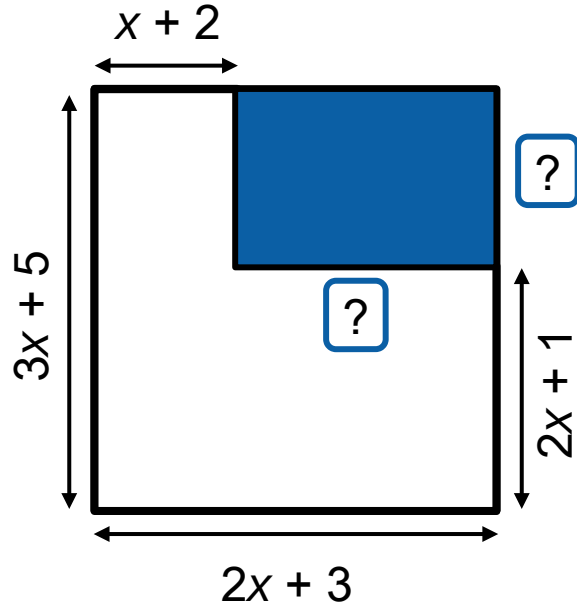
Waxaan sidoo kale u arki karnaa
sidii hal leydi oo weyn oo laga
jaray leydi yar.



Axmed

Waa maxay cabbirrada leydiyadan?

Bedka qaababka isku dhafan (Area of compound shapes)



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

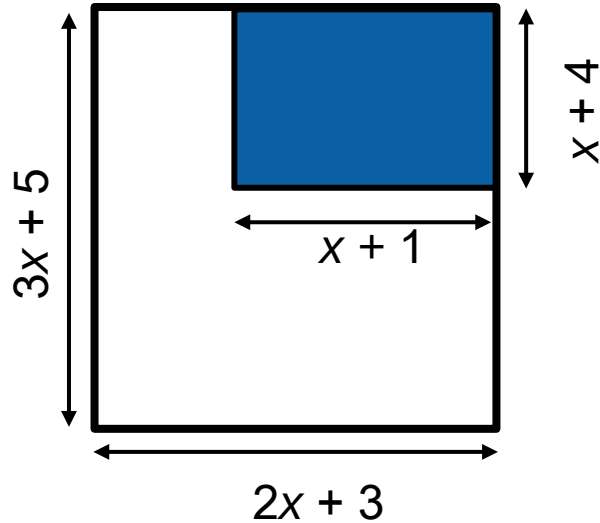
$$2x + 3 - x - 2$$

$$x + 1$$

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

$$x + 4$$

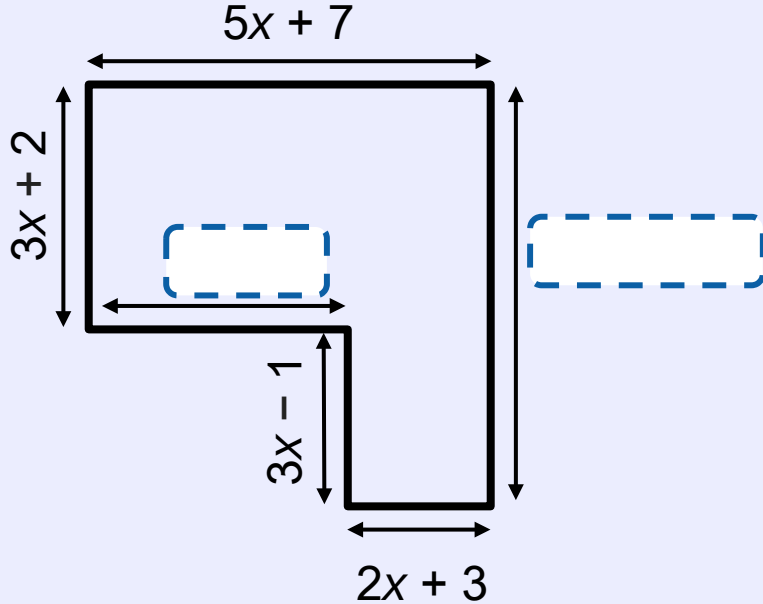
Bedka qaababka isku dhafan (Area of compound shapes)



Hadda waan fududayn karnaa (expand simplify):
 $(3x + 5)(2x + 3) - (x + 1)(x + 4)$

Bedka qaababka isku dhafan (Area of compound shapes)

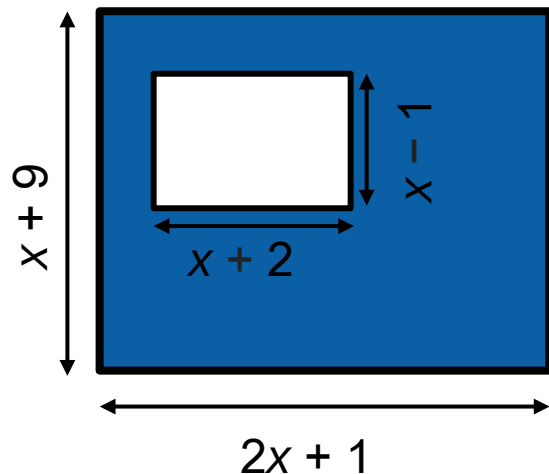
Soo hel cabbirrada maqan ee qaabkan isku dhafan.



Bedka qaababka isku dhafan (Area of compound shapes)

Sideen u xisaabin karnaa bedka qaabka hadhka leh?

Ka jar bedka leydiga yar bedka leydiga weyn.



$$(2x + 1)(x + 9) - (x + 2)(x - 1)$$

$$2x^2 + 18x + x + 9 - (x^2 - 1x + 2x - 2)$$

$$2x^2 + 19x + 9 - (x^2 + x - 2)$$

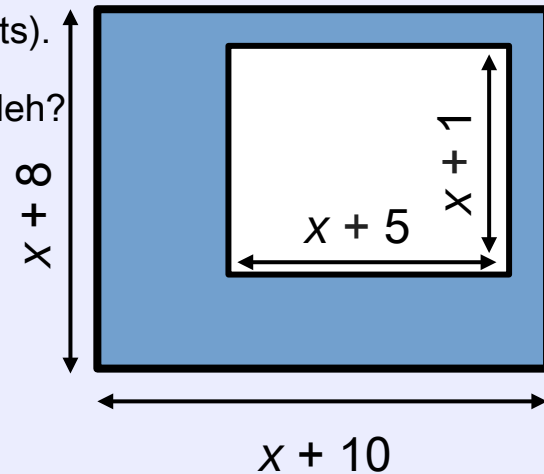
$$x^2 + 18x + 11$$

$$9 - (-2) = 11$$

Bedka qaababka isku dhafan (Area of compound shapes)

Bedka qaabka hadhka leh waa 250 halbeeg oo laba jibaaran (square units).

Kee mid ka mid ah kuwani waa isla'eg (equation) bedka qaabka hadhka leh?



a $(x + 10)(x + 1) - (x + 5)(x + 8) = 250$

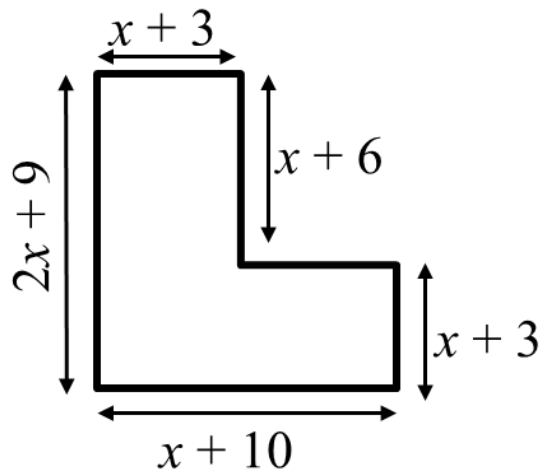
b $(x + 10)(x + 8) + (x + 1)(x + 5) = 250$

c $(x + 10)(x + 8) - (x + 5)(x + 1) = 250$ ✓

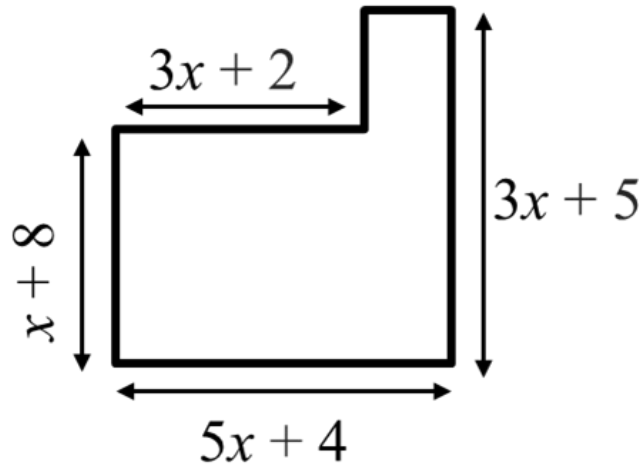
d $(x + 10) - (x + 5) \times (x + 8) - (x + 1) = 250$

Bedka qaababka isku dhafan (Area of compound shapes)

1) Qor tibaax fududaysan (simplified expression)
oo loogu talagalay bedka qaabkan.

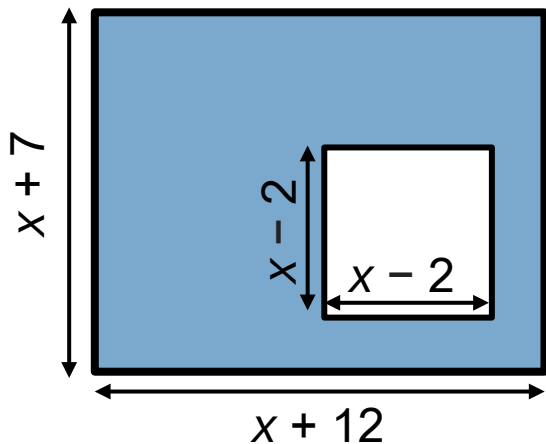


2) Qor tibaax fududaysan (simplified expression)
oo loogu talagalay bedka qaabkan.



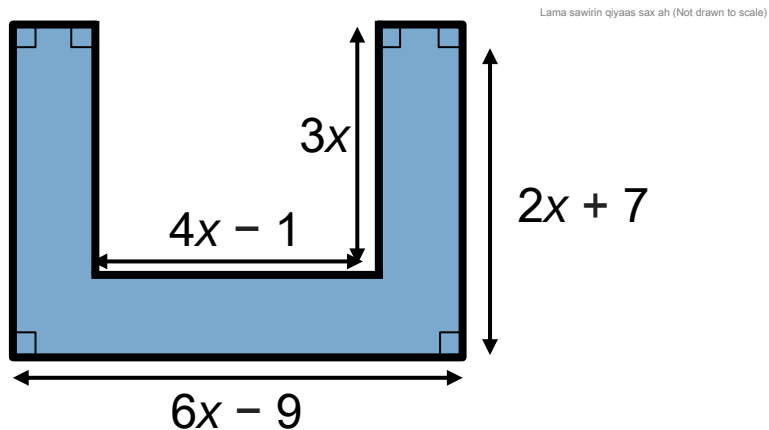
Bedka qaababka isku dhafan (Area of compound shapes)

3a) Xisaabi tibaax fudud oo ah bedka qaabka hadhka leh.



b) Bedka qaabka hadhka leh waa 149 halbeeg oo laba jibaaran (square units). Isticmaal tan si aad u hesho qiimaha (value) x .

4a) Xisaabi tibaax fudud oo ah bedka qaabka hadhka leh.



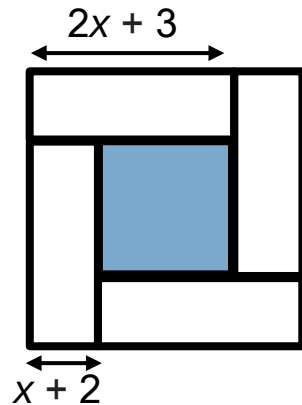
b) Bedka qaabka hadhka leh waa 99 halbeeg oo laba jibaaran. Isticmaal tan si aad u hesho qiimaha x

5) Afar leydi oo isku mid ah ayaa ku wareegsan dibadda laba jibaaranka hadhka leh.

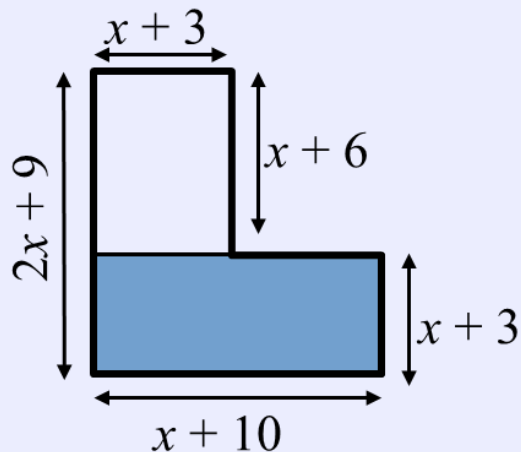
a) Raadi tibaax fudud oo ah bedka hal leydi.

b) Raadi tibaax fudud oo ah bedka qaabka oo dhan.

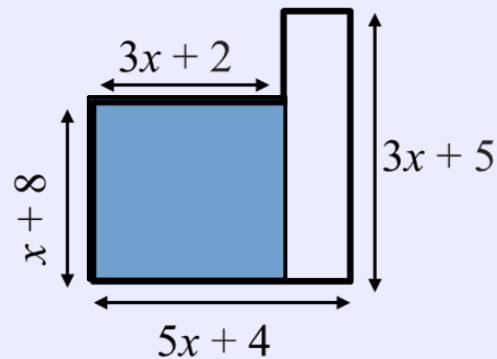
c) Raadi tibaax fudud oo ah bedka laba jibaaranka hadhka leh.



1) Xisaabi tibaax fudud oo ah bedka qaabkan.

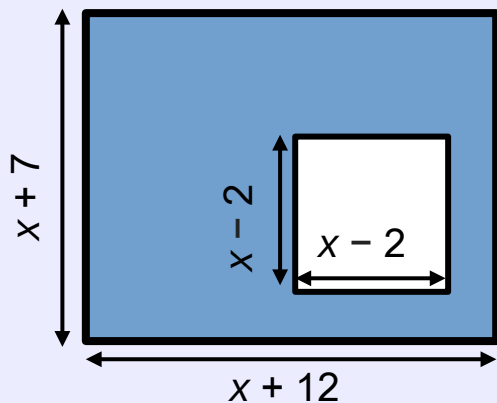


2) Xisaabi tibaax fudud oo ah bedka qaabkan.



$$(3x^2 + 24x + 2x + 16) + (6x^2 + 10x + 6x + 10)$$

3a) Xisaabi tibaax fudud oo ah bedka qaabka hadhka leh.



$$(x + 12)(x + 7) - (x - 2)(x - 2)$$

$$(x^2 + 7x + 12x + 84) - (x^2 - 2x - 2x + 4)$$

$$(x^2 + 19x + 84) - (x^2 - 4x + 4)$$

$$23x + 80$$

b) Bedka qaabka hadhka leh waa 149 halbeeg oo laba jibaaran. Isticmaal tan si aad u hesho qiimaha x

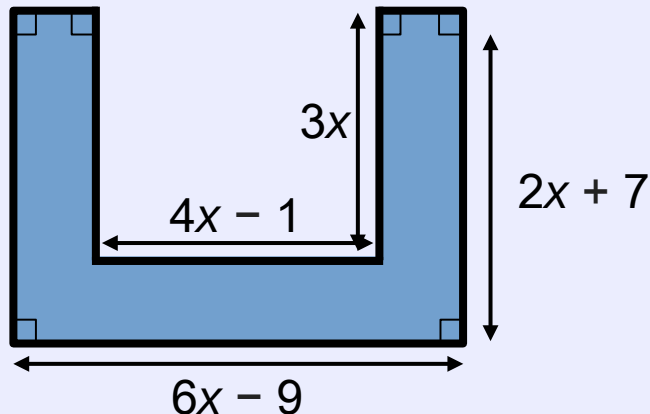
$$23x + 80 = 149$$

$$23x + 80 - 80 = 149 - 80$$

$$23x = 69$$

$$x = 3$$

4a) Xisaabi tibaax fudud oo ah bedka qaabka hadhka leh.



b) Bedka qaabka hadhka leh waa 99 halbeeg oo laba jibaaran. Isticmaal tan si aad u hesho qiimaha x

$$(6x - 9)(2x + 7) - 3x(4x - 1)$$

$$(12x^2 + 42x - 18x - 63) - (12x^2 - 3x)$$

$$(12x^2 + 24x - 63) - (12x^2 - 3x)$$

$$27x - 63$$

$$27x - 63 = 99$$

$$(27x - 63) \div 9 = 99 \div 9$$

$$3x - 7 = 11$$

$$3x - 7 + 7 = 11 + 7$$

$$3x = 18$$

$$x = 6$$

5) Afar leydi (rectangle) oo isku mid ah ayaa ku wareegsan bannaanka labajibbaaran (square) hadhsan.

a) Raadi tibaax fudud oo ah bedka hal leydi.

$$(2x + 3)(x + 2) \equiv 2x^2 + 4x + 3x + 6$$

$$\equiv 2x^2 + 7x + 6$$

b) Raadi tibaax fudud oo ah bedka qaabka oo dhan.

$$2x + 3 + x + 2 \equiv 3x + 5$$

$$(3x + 5)^2 \equiv 9x^2 + 30x + 25$$

c) Raadi tibaax (expression) fudud oo ah bedka (area) labajibbaaran (square) hadhsan.

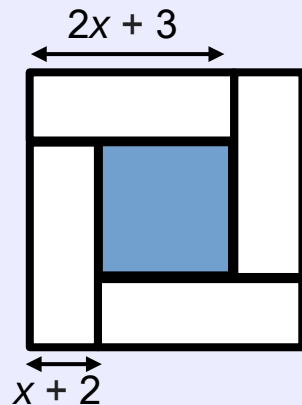
$$4(2x^2 + 7x + 6) \equiv 8x^2 + 28x + 24$$

$$9x^2 + 30x + 25 - (8x^2 + 28x + 24) \equiv x^2 + 2x + 1$$

ama

$$2x + 3 - (x + 2) \equiv x + 1$$

$$(x + 1)^2 \equiv x^2 + 2x + 1$$



Soo koobid

Xallinta (Solving) mashaakilka (problems) iyadoo la isticmaalayo tibaax (expressions) iyo qaaciidooyin (formulae)

Marka dhererka (lengths) qaab (shape) loo bixiyo tibaax (expressions), sharciga qaybinta (distributive law) ayaa loo isticmaali karaa in lagu qoro tibaax (expression) bedka (area) oo qaab ballaaran (expanded form) ah.

Bedka (Area) qaababka (shapes) isku dhafan (compound) ama gobollada (regions) hadhsan waxaa laga heli karaa iyadoo lagu darayo ama laga jarayo bedka (areas) qaababka (shapes) la yaqaan.