3.7 Multiplying Polynomials

Lesson Focus

Extend the strategies for multiplying binomials to multiplying polynomials

Bigger than FOIL

To distribute a binomial multiplied by a binomial remember FOIL

F – (first)(first)
O – (outside)(outside)
I – (inside)(inside)
L – (last)(last)

$$(h + 11)(h + 5)$$

The distributive property can be used to perform any polynomial multiplication

Each term of one polynomial must be multiplied by **each term** of the other polynomial

Example

Expand and simplify.

a) $(2h + 5)(h^2 + 3h - 4)$

$= 2h^3 + 6h^2 - 8h + 5h^2 + 15h - 20$

$= 2h^3 + 11h^2 + 7h - 20$

Degree 3

constant

Example

Expand and simplify.

b) $(-3f^2 + 3f - 2)(4f^2 - f - 6)$

$= -12f^4 + 3f^3 + 18f^2 + 12f^3 - 3f^2 - 18f - 8f^2 + 2f + 12$

$= -12f^4 + 15f^3 + 7f^2 - 16f + 12$

Example – Your Turn

Expand and simplify.

a) $(3k + 4)(k^2 - 2k - 7)$

b) $(-2t^2 + 4t - 3)(5t^2 - 2t + 1)$

Example – More than 1 Variable

Expand and simplify.

a) $(2r + 5t)^2$

b) $(3x - 2y)(4x - 3y + 5)$

$= (2r + 5t)(2r + 5t)$

$= 4r^2 + 10rt + 10rt + 25t^2$

$= 4r^2 + 20rt + 25t^2$

b) $(3x - 2y)(4x - 3y + 5)$

$= 12x^2 - 9xy + 15x - 8xy + 6y^2 - 10y$

$= 12x^2 - 17xy + 15x - 10y + 6y^2$

$$(2r+5t)^2$$

$$= 4r^2 + 20rt + 25t^2$$

Homework

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 # 4a,c, 5b,d,f, 7a, 8

Example

Expand and simplify.

a) $(2c-3)(c+5)+3(c-3)(-3c+1)$

$=2c^2+10c-3c-15+(3c-9)(-3c+1)$

$=2c^2+7c-15+(-9c^2+3c+27c-9)$

$=2c^2+7c-15-9c^2+30c-9$

$=-7c^2+37c-24$

Example

Expand and simplify.

b) $(3x + y - 1)(2x - 4) - (3x + 2y)^2$

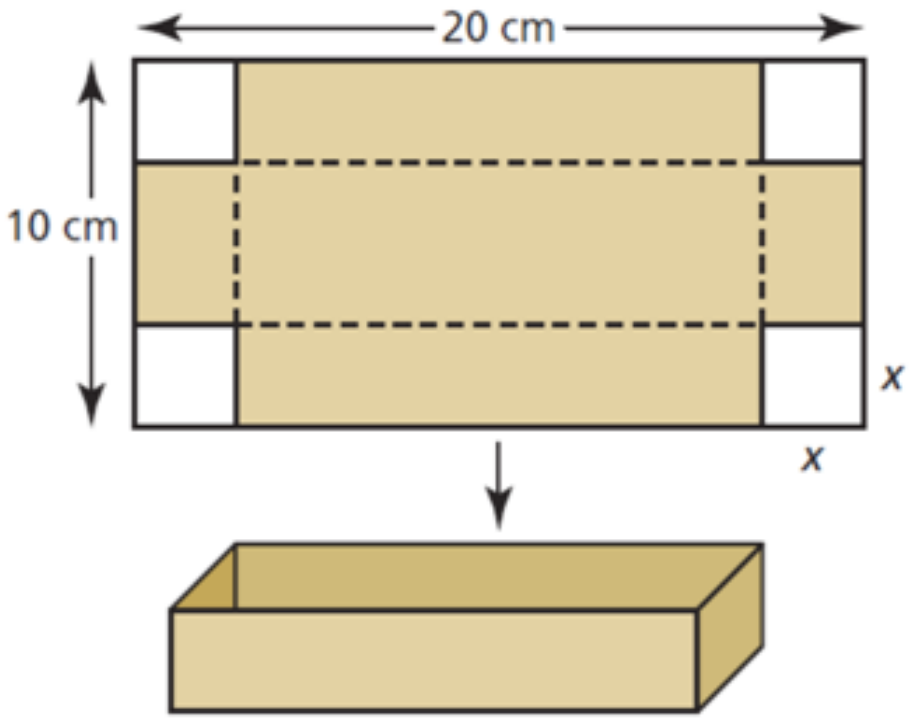
$= 6x^2 - 12x + 2xy - 4y - 2x + 4 - (9x^2 + 12xy + 4y^2)$

$= 6x^2 - 14x + 2xy - 4y + 4 - 9x^2 - 12xy - 4y^2$

$= -3x^2 - 14x - 10xy - 4y - 4y^2 + 4$

Example

A box with no top is made from a piece of cardboard 20 cm by 10 cm. Equal squares are cut from each corner and the sides are folded up.



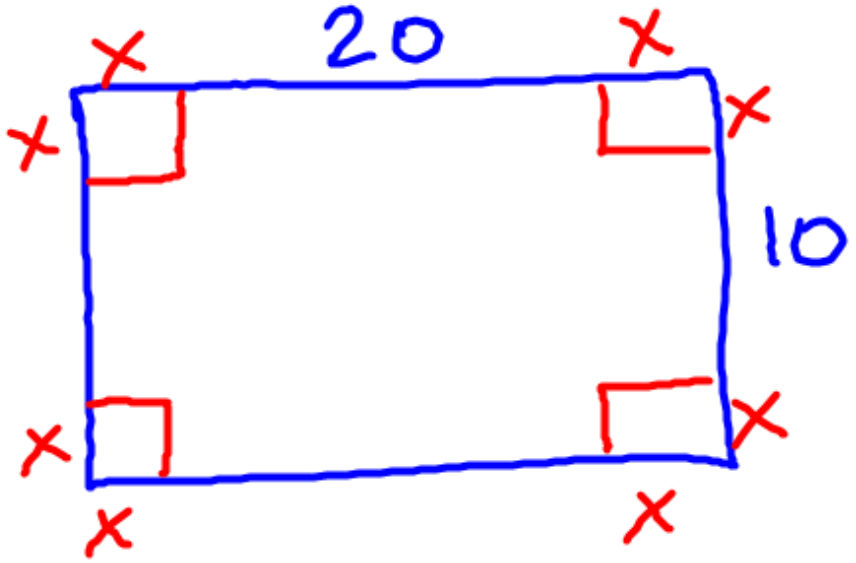
Let x centimetres represent the side length of each square cut out. Write a polynomial to represent each measurement. Simplify each polynomial.

a) the length of the box

b) the width of the box

c) the area of the base of the box

d) the volume of the box

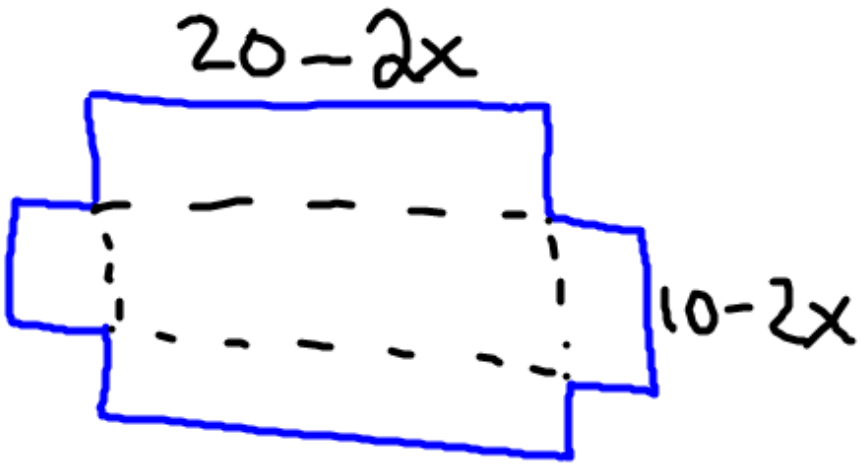


a) Length

$20-2x$

b) Width

$10-2x$

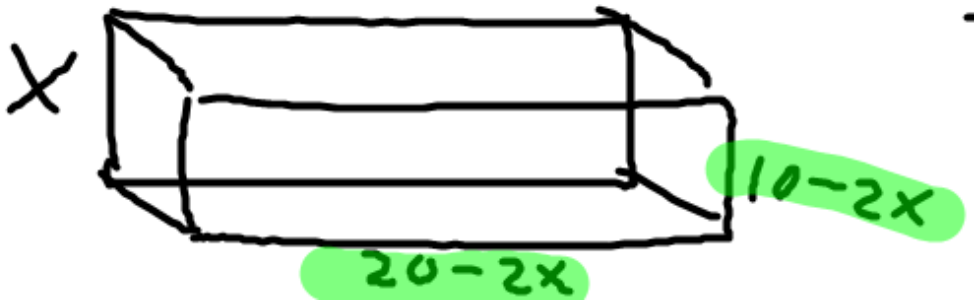


c) Area Base

$(20-2x)(10-2x)$

$= 200-40x-20x+4x^2$

$= 4x^2-60x+200$



d) Volume Box

$V = (20-2x)(10-2x)x$

L W H

$V = (4x^2 - 60x + 200)x$

$V = 4x^3 - 60x^2 + 200x$

Homework

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 # 15, 17,18b, 21

I know it's a lot, but the best way to improve is to PRACTICE PRACTICE PRACTICE!!!