

Example 1 Multiply Binomials

Multiply.

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

b) $(x - 2y)(x - 4y)$

Example 2 Multiply a Binomial and a Trinomial

Multiply the following binomial and **trinomial**.

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

Example 3 Perform Operations on Products of Polynomials

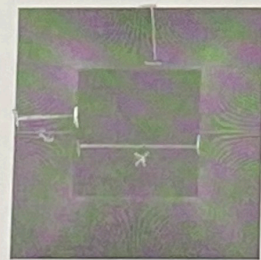
Simplify.

a) $(x + 1)(5x + 3) + 3(2x + 4)(6x - 2)$

b) $(3w - 2)(4w + 5) - (w - 7)(2w + 3)$

Example 4 Apply Binomial Multiplication

The painting shown is *Deep Magenta Square* by Richard Anuszkiewicz. It can be used to represent binomial multiplication. The length of the red square in the painting is unknown. The width of the border around the square is 30 cm.



a) What polynomial expression represents the total area of the painting?

b) What is the total area of the painting if the red square has an area of 3600 cm²?

$$\sqrt{3600} \\ = 60$$

$$= (x + 60) \\ \rightarrow (60 + 60) \\ = 120 \text{ cm}$$

5.1 Multiplying Polynomials

Ex 1 Coefficients - Variables

a) $(x - 3)(2x + 1)$
 $2x^2 + x - 6x - 3$
 $2x^2 - 5x - 3$

b) $(x - 2y)(x - 4y)$
 $x^2 - 4xy - 2xy + 8y^2$
 $x^2 - 6xy + 8y^2$

Ex 2:

a) $(x + 2)(2x^2 - 5x + 1)$
 $2x^3 - 5x^2 + x + 4x^2 - 10x + 2$
 $2x^3 - x^2 - 9x + 2$

Ex 3:

a) $(x + 1)(5x + 3) + 3(2x + 4)(6x - 2)$
 $5x^2 + 3x + 5x + 3 + (6x + 12)(6x - 2)$
 $5x^2 + 8x + 3 + 36x^2 - 12x + 72x - 24$
 $41x^2 + 68x - 21$

b) $(3w - 2)(4w + 5) - (w - 7)(2w + 3)$
 $12w^2 + 15w - 8w - 10 - (2w^2 + 3w - 14w - 21)$
 $12w^2 + 15w - 8w - 10 - 2w^2 - 3w + 14w + 21$
 $10w^2 + 18w + 11$

Ex 4. a) $A = lw$ let $x =$ length of the inner square

$$= (x + 60)(x + 60) \\ = x^2 + 60x + 60x + 3600 \\ = x^2 + 120x + 3600$$

b) $A = lw$
 $= (120)(120)$
 $= 14400 \text{ cm}^2$

