

Lesson 9-5

Example 1

Find the product $(x + 4)(x + 5)$.

Solution

$$\begin{aligned}(x + 4)(x + 5) &= (x)(x + 5) + (4)(x + 5) \\ &= x(x) + x(5) + 4(x) + 4(5) \\ &= x^2 + 5x + 4x + 20 \\ &= x^2 + 9x + 20\end{aligned}$$

Example 2

Simplify.

a. $(x + 4)(x - 6)$

b. $(n + 3)(n - 3)$

c. $(y - 7)^2$

Solution

Multiply binomials and use the distributive property.

$$\begin{aligned}\text{a. } (x + 4)(x - 6) &= (x + 4)[x + (-6)] \\ &= x(x) + x(-6) + 4(x) + 4(-6) \\ &= x^2 + (-6x) + 4x + (-24) \\ &= x^2 - 2x - 24\end{aligned}$$

$$\begin{aligned}\text{b. } (n + 3)(n - 3) &= (n + 3)[n + (-3)] \\ &= n(n) + n(-3) + 3(n) + 3(-3) \\ &= n^2 + 0n + (-9) \\ &= n^2 - 9\end{aligned}$$

$$\begin{aligned}\text{c. } (y - 7)^2 &= (y - 7)(y - 7) \\ &= [y + (-7)][y + (-7)] \\ &= y(y) + (-7)(y) + (-7)(y) + (-7)(-7) \\ &= y^2 - 14y + 49\end{aligned}$$

Example 3**Simplify.**

$$3(z + 2)(z - 5) - 6(z - 1)(z + 5)$$

Solution

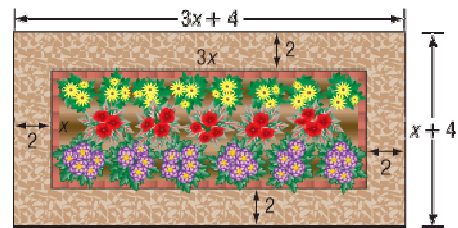
$$\begin{aligned} 3(z + 2)(z - 5) - 6(z - 1)(z + 5) &= 3[z^2 - 5z + 2z + 2(-5)] + (-6)[z^2 - z + 5z - 1(5)] \\ &= 3(z^2 - 3z - 10) + (-6)(z^2 + 4z - 5) \\ &= 3z^2 - 9z - 30 + (-6z^2) + (-24z) + 30 \\ &= -3z^2 - 33z \end{aligned}$$

Example 4

A rectangular flower garden is three times as long as it is wide. A walkway surrounding the garden is 2 m wide and has an area of 64 m^2 . Find the dimensions of the garden.

Solution

Make a drawing. Let x represent the width of the garden. Label the other dimensions in terms of x .



area of walkway = area of garden and walkway - area of garden

$$64 = (3x + 4)(x + 4) - (3x)(x)$$

$$64 = 3x^2 + 12x + 4x + 16 - 3x^2$$

$$64 = 16x + 16$$

$$48 = 16x$$

$$3 = x$$

The width of the flower garden is 3 m. The length is three times the width, or 9 m.