



Objective 2 TEKS A.4.A Review

A.4.A Find specific function values, simplify polynomial expressions, transform and solve equations, and factor as necessary in problem situations.

You can multiply two binomials, $ax + b$ and $cx + d$, using the acronym **FOIL**, which stands for **F**irst terms, **O**uter terms, **I**nner terms, and **L**ast terms.

To use FOIL, multiply the pairs of **f**irst, **o**uter, **i**nner, and **l**ast terms. Then combine any similar terms.

$$\begin{aligned} & \mathbf{F} \quad \mathbf{L} \quad \mathbf{F} \quad \mathbf{L} \quad \mathbf{F} \text{irst} + \mathbf{O} \text{uter} + \mathbf{I} \text{nner} + \mathbf{L} \text{ast} \\ (2x + 1)(3x + 4) &= (2x \cdot 3x) + (2x \cdot 4) + (1 \cdot 3x) + (1 \cdot 4) \\ \mathbf{O} \quad \mathbf{I} \quad \mathbf{I} \quad \mathbf{O} &= 6x^2 + 8x + 3x + 4 \\ &= 6x^2 + 11x + 4 \end{aligned}$$

EXAMPLE

A rectangular garden has an area of $2x^2 - 5x - 12$ square feet and a length of $2x + 3$ feet. What binomial represents the width of the garden?

$$\begin{aligned} 2x^2 - 5x - 12 &= (2x + 3)(cx + d) && \text{Area of a rectangle} = \text{length} \cdot \text{width} \\ &= (2x + 3)(x - 4) && \text{You know } c = 1 \text{ because } 2x \cdot cx \text{ must equal } 2x^2. \text{ You also know } d = -4 \text{ because } 3 \cdot d \text{ must equal } -12. \end{aligned}$$

Check the middle term of the polynomial: $2x \cdot (-4) + 3 \cdot x = -8x + 3x = -5x \checkmark$

Since $(2x + 3)(x - 4) = 2x^2 - 5x - 12$, the garden is $x - 4$ feet wide.

YOU DO IT

- A rectangular panel has an area of $5x^2 - 8x + 3$ square meters and a width of $x - 1$ meters. What binomial represents the length of the panel?
 - $5x^2 - 8x + 3 = (ax + b)(\underline{x - 1})$ What is the panel's length?
 - Since $x \cdot 5x = 5x^2$, the value of a is 5.
 - Since $(-3)(-1) = 3$, the value of b is -3.
 - Does $(5x - 3)(x - 1) = 5x^2 - 8x + 3$? Yes
 - What binomial represents the length of the panel? $5x - 3$
- What are the solutions of $12x^2 + 4x - 5 = 0$?
 - $12x^2 + 4x - 5 = (2x - 1)(\underline{6x} + \underline{5})$ *Factor the trinomial.*
 - $(2x - 1)(\underline{6x + 5}) = 0$ *Substitute.*
 - $2x - 1 = 0$ or $(\underline{6x + 5}) = 0$ *Set each factor equal to zero.*
 - $x = \frac{1}{2}$ or $x = \underline{-\frac{5}{6}}$ *Solve each equation.*
 - The solutions are $\frac{1}{2}$ and $-\frac{5}{6}$.