

## *Warm Up*

*Simplify the following expressions.*

1.  $(x^2)(x^5)$

$x^7$

2.  $3(x + 4)$

$3x + 12$

3.  $\underline{6}x + \underline{7}x$

$13x$

4.  $(8y)(2y^2)$

$8 \cdot 2 y^{1+2} = \boxed{16y^3}$

# *Multiplying Polynomials*

## Clear Learning Target

*You will be able to multiply polynomials by monomials and other polynomials.*

### Example #1: Simplify.

$$3x(x + 4)$$

$$3x^1 \cdot x^1 + 3x \cdot 4$$

$$3x^2 + 12x$$

Cannot  
combine  
(not like  
terms!)

**You Try!** Simplify.

$$2d^2(-4d + 9)$$

$$\underbrace{2d^2 \cdot -4d^1}_{-8d^3} + \underbrace{2d^2 \cdot 9}_{18d^2}$$

$$\boxed{-8d^3 + 18d^2}$$

**Example #2:** Simplify.

$$2p(-4p^2 + 5p) - 5p^2$$

① Distribute:  $\underbrace{2p \cdot -4p^2}_{-8p^3} + \underbrace{2p \cdot 5p}_{10p^2} - 5p^2$

② Multiply  $-8p^3 + 10p^2 - 5p^2$

③ Combine Like Terms

$$\boxed{-8p^3 + 5p^2}$$

**You Try!** Simplify.

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

$$\textcircled{1} \quad \underbrace{x \cdot 3x^2} + \underbrace{x \cdot 4} + 2x$$

$$\textcircled{2} \quad 3x^3 + 4x + 2x$$

$$\textcircled{3} \quad \boxed{3x^3 + 6x}$$

**Example #3:** Simplify using the F.O.I.L. method.

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

I U N A  
R T S S  
S S I T  
T I D E  
E

$$\begin{array}{cccc} \text{FIRST} & \text{OUTSIDE} & \text{INSIDE} & \text{LAST} \\ \hline 2x \cdot x & + 2x \cdot 5 & + 3 \cdot x & + 3 \cdot 5 \end{array}$$

$$2x^2 + 10x + 3x + 15$$

$$\boxed{2x^2 + 13x + 15}$$

**You Try!** Simplify using the F.O.I.L. method.

$$x^2 = x \cdot x$$

$$(2a - 5)^2$$

$$(2a - 5)(2a - 5)$$

$$2a \cdot 2a + 2a \cdot -5 + -5 \cdot 2a + -5 \cdot -5$$

$$4a^2 - 10a - 10a + 25$$

$$4a^2 - 20a + 25$$