

Lesson #2:

The Distributive Property

Learning Target:

Using the distributive property to multiply a polynomial by a constant.

The Distributive Property:


$$a(b + c) = (a)(b) + (a)(c) \quad \text{or} \quad a(b - c) = (a)(b) - (a)(c)$$

The **Distributive Property** is used when an algebraic expression that contains multiple terms is being multiplied by another one-term algebraic expression.

In this lesson we will look at how the property works when we multiply a binomial or trinomial by a **constant**.

This is also referred to as "**expanding**" the expressions. We are able to get rid of the brackets in the problem when the terms inside the brackets can't be combined together.

Example: $a(b + c) = (a)(b) + (a)(c)$
(constant in front of brackets)




A diagram above the equation shows a blue curved arrow starting from the number 6 and pointing to the 4x term, and a red curved arrow starting from the number 6 and pointing to the 3y term.

$$6(4x + 3y) = 6(4x) + 6(3y)$$
$$= 24x + 18y$$

Example: $a(b + c) = (a)(b) + (a)(c)$
(constant in front of brackets)

$$\begin{aligned} -5(2 + 4y) &= -5(2) + (-5)(4y) \\ &= -10 + (-20y) \\ &= -20y - 10 \end{aligned}$$

Example: $a(b - c) = (a)(b) - (a)(c)$
(constant in front of brackets)



A blue curved arrow points from the '6' in the first term to the '2n' in the second term. A red curved arrow points from the '6' in the first term to the '-5mn' in the second term.

$$\begin{aligned}6(2n - 5mn) &= 6(2n) - 6(5mn) \\ &= 12n - 30mn \\ &= -30mn + 12n\end{aligned}$$

Example: $a(b - c) = (a)(b) - (a)(c)$
(constant in front of brackets)

$$\begin{aligned} -2(6 - 8p) &= -2(6) - (-2)(8p) \\ &= -12 + 16p \\ &= 16p - 12 \end{aligned}$$

Example: $(b + c)k = (k)(b) + (k)(c)$
(constant after the brackets)

$$\begin{aligned} (3x + 15y)(2) &= 2(3x) + 2(15y) \\ &= 6x + 30y \end{aligned}$$

Example: $(b + c)k = (k)(b) + (k)(c)$
(constant after the brackets)

$$\begin{aligned} (4m^2 + 3m)(-7) &= (-7)(4m^2) + (-7)(3m) \\ &= -28m^2 - 21m \end{aligned}$$

Example: $(b - c)k = (k)(b) - (k)(c)$
(constant after the brackets)

$$\begin{aligned} (2a^2 - b)(10) &= 10(2a^2) - 10(b) \\ &= 20a^2 - 10b \end{aligned}$$

Example: $(b - c)k = (k)(b) - (k)(c)$
(constant after the brackets)

$$\begin{aligned} (20x - 3y)(-6) &= (-6)(20x) - (-6)(3y) \\ &= -120x + 18y \end{aligned}$$

You Try:

$$5(9 + 3x)$$

$$-8(2n - 3)$$

$$(11a + 2b)(7)$$

You Try:

$$5(9 + 3x) = 15x + 45$$

$$-8(2n - 3) = -16n + 24$$

$$(11a + 2b)(7) = 77a + 14b$$

Check your understanding questions:

Handout:

#1 - 16

$$1) 6(1 - 5m)$$

$$-30m + 6$$

$$2) -2(1 - 5v)$$

$$10v - 2$$

$$3) 3(4 + 3r)$$

$$9r + 12$$

$$4) 3(6r + 8)$$

$$18r + 24$$

$$5) 4(8n + 2)$$

$$32n + 8$$

$$6) -(-2 - n)$$

$$n + 2$$

$$7) -6(7k + 11)$$

$$-42k - 66$$

$$8) -3(7n + 1)$$

$$-21n - 3$$

$$9) -6(1 + 11b)$$

$$-66b - 6$$

$$10) -10(a - 5)$$

$$-10a + 50$$

$$11) -3(1 + 2v)$$

$$-6v - 3$$

$$12) -4(3x + 2)$$

$$-12x - 8$$

$$13) (3 - 7k) \cdot -2$$

$$14k - 6$$

$$14) -20(8x + 20)$$

$$-160x - 400$$

$$15) (7 + 19b) \cdot -15$$

$$-285b - 105$$

$$16) (x + 1) \cdot 14$$

$$14x + 14$$