

Lesson 1-5

Example 1 Distribute Over Addition

Rewrite $(3+11)5$ using the Distributive Property. Then evaluate.

$$\begin{aligned}(3 + 11)5 &= 3 \cdot 5 + 11 \cdot 5 && \text{Distributive Property} \\ &= 15 + 55 && \text{Multiply.} \\ &= 70 && \text{Add.}\end{aligned}$$

Example 2 Distribute Over Subtraction

Rewrite $2(13 - 7)$ using the Distributive Property. Then evaluate.

$$\begin{aligned}2(13 - 7) &= 2(13) - 2(7) && \text{Distributive Property} \\ &= 26 - 14 && \text{Multiply.} \\ &= 12 && \text{Subtract.}\end{aligned}$$

Example 3 Use the Distributive Property

A music store charges 6% sales tax on all items. Ryan buys a CD for \$17.50 and a set of headphones for \$10.50. Find the total cost of the two items.

Use the Distributive Property to write and evaluate an expression.

Let 1.06 equal the total percentage of each item you will pay. 100% is the cost of the item plus 6% is the amount of the sales tax. $1+0.06 = 1.06$.

$$\begin{aligned}1.06(17.50 + 10.50) &= 1.06(17.50) + 1.06(10.50) && \text{Distributive Property} \\ &= 18.55 + 11.13 && \text{Multiply.} \\ &= 29.68 && \text{Add.}\end{aligned}$$

The total cost of the CD and the headphones is \$29.68.

Example 4 Use the Distributive Property

Use the Distributive Property to find each product.

a. $12 \cdot 104$

$$\begin{aligned}12 \cdot 104 &= 12(100 + 4) && \text{Think: } 104 = 100+4 \\ &= 12(100) + 12(4) && \text{Distributive Property} \\ &= 1200 + 48 && \text{Multiply.} \\ &= 1248 && \text{Add.}\end{aligned}$$

b. $22\left(3\frac{1}{11}\right)$

$$\begin{aligned}22\left(3\frac{1}{11}\right) &= 22\left(3 + \frac{1}{11}\right) && \text{Think: } 3\frac{1}{11} = 3 + \frac{1}{11} \\ &= 22(3) + 22\left(\frac{1}{11}\right) && \text{Distributive Property} \\ &= 66 + 2 && \text{Multiply.} \\ &= 68 && \text{Add.}\end{aligned}$$

Example 5 Algebraic Expressions

Rewrite each product using the Distributive Property. Then simplify.

a. $(x + 7)4$

$$(x + 7)4 = x \cdot 4 + 7 \cdot 4 \quad \text{Distributive Property} \\ = 4x + 28 \quad \text{Multiply.}$$

b. $2(3a - b + 2c^2)$

$$2(3a - b + 2c^2) = 2(3a) - 2(b) + 2(2c^2) \quad \text{Distributive Property} \\ = 6a - 2b + 4c^2 \quad \text{Multiply.}$$

Example 6 Combine Like Terms

Simplify each expression.

a. $3y^2 + 7y^2 + 2xy$

$$3y^2 + 7y^2 + 2xy = (3 + 7)y^2 + 2xy \quad \text{Distributive Property} \\ = 10y^2 + 2xy \quad \text{Substitution}$$

b. $\frac{b}{3} + \frac{2}{3}b + 2b$

$$\frac{b}{3} + \frac{2}{3}b + 2b = b\left(\frac{1}{3} + \frac{2}{3} + 2\right) \quad \text{Distributive Property} \\ = b(3) \quad \text{Substitution}$$