

Lesson 1-2

Example 1 Evaluate Expressions

Evaluate each expression.

a. $12 - 4 \div 2 \cdot 5$

$$\begin{aligned} 12 - 4 \div 2 \cdot 5 &= 12 - 2 \cdot 5 && \text{Divide 4 by 2.} \\ &= 12 - 10 && \text{Multiply 2 by 5.} \\ &= 2 && \text{Subtract 10 from 12.} \end{aligned}$$

b. $36 \div 3^2 + 4 \cdot 2 - 1$

$$\begin{aligned} 36 \div 3^2 + 4 \cdot 2 - 1 &= 36 \div 9 + 4 \cdot 2 - 1 && \text{Evaluate powers.} \\ &= 4 + 4 \cdot 2 - 1 && \text{Divide 36 by 9.} \\ &= 4 + 8 - 1 && \text{Multiply 4 by 2.} \\ &= 12 - 1 && \text{Add 4 and 8.} \\ &= 11 && \text{Subtract 1 from 12.} \end{aligned}$$

Example 2 Grouping Symbols

Evaluate each expression.

a. $6(11 - 7) - 4(2 + 1)$

$$\begin{aligned} 6(11 - 7) - 4(2 + 1) &= 6(4) - 4(3) && \text{Evaluate inside grouping symbols.} \\ &= 24 - 12 && \text{Multiply expressions left to right.} \\ &= 12 && \text{Subtract 12 from 24.} \end{aligned}$$

b. $4[(16 \div 2) - (4 + 2)]$

$$\begin{aligned} 4[(16 \div 2) - (4 + 2)] &= 4[(8) - (6)] && \text{Evaluate innermost expression first.} \\ &= 4[2] && \text{Evaluate expression in grouping symbol.} \\ &= 8 && \text{Multiply.} \end{aligned}$$

Example 3 Fraction Bar

Evaluate $\frac{3^3 + 9}{11 - 2^2}$.

$$\frac{3^3 + 9}{11 - 2^2} \text{ means } (3^3 + 9) \div (11 - 2^2).$$

$$\frac{3^3 + 9}{11 - 2^2} = \frac{27 + 9}{11 - 2^2} \quad \text{Evaluate the power in the numerator.}$$

$$= \frac{3}{11 - 2^2} \quad \text{Divide 27 by 9 in the numerator.}$$

$$= \frac{3}{11 - 4} \quad \text{Evaluate the power in the denominator.}$$

$$= \frac{3}{7} \quad \text{Subtract 4 from 11 in the denominator.}$$

Example 4 Evaluate an Algebraic Expression

Evaluate $(x^2 - 2zy) + y^3$ if $x = 8$, $y = 3$ and $z = 5$.

$$\begin{aligned}(x^2 - 2zy) + y^3 &= (8^2 - 2 \cdot 5 \cdot 3) + 3^3 && \text{Replace } x \text{ with } 8, y \text{ with } 3, \text{ and } z \text{ with } 5. \\ &= (64 - 2 \cdot 5 \cdot 3) + 3^3 && \text{Evaluate } 8^2. \\ &= (64 - 30) + 3^3 && \text{Multiply } 2, 5, \text{ and } 3. \\ &= (34) + 3^3 && \text{Subtract } 30 \text{ from } 64. \\ &= 34 + 27 && \text{Evaluate } 3^3. \\ &= 61 && \text{Add } 34 \text{ and } 27.\end{aligned}$$

Example 5 Use Algebraic Expressions.

Jamie has \$500 to invest for 3 years. She finds a bank that will invest her money at a simple interest rate of 5%. Interest I is equal to the principle P (amount invested) times the product of the rate r as a decimal and the time t in years.

a. Write an expression that represents simple interest.

$$\begin{array}{ccccc} \text{principal} & & \text{times} & & \text{the product of} \\ \underbrace{\hspace{2cm}} & & \underbrace{\hspace{1cm}} & & \underbrace{\hspace{2cm}} \\ & & \times & & \text{rate and time} \\ P & & & & (r \times t) \quad \text{or } Prt \end{array}$$

b. Find the amount of interest earned after 3 years.

Evaluate Prt for $P = 500$, $r = 0.05$, and $t = 3$.

$$\begin{aligned}Prt &= 500(0.05)(3) && P = 500, r = 0.05, \text{ and } t = 3 \\ &= 25(3) && \text{Multiply } 500 \text{ by } 0.05. \\ &= 75 && \text{Multiply } 25 \text{ by } 3.\end{aligned}$$

The amount of interest Jamie will earn in 3 years will be \$75.