

# Study Guide and Intervention

7AF1.2, 7AF1.3, 7AF1.4

## Variables, Expressions, and Properties

When finding the value of an expression with more than one operation, perform the operations in the order specified by the order of operations.

### Order of Operations

1. Perform all operations within grouping symbols first; start with the innermost grouping symbols.
2. Evaluate all powers before other operations.
3. Multiply and divide in order from left to right.
4. Add and subtract in order from left to right.

### Example 1 Evaluate the expression $(5 + 7) \div 2 \times 3 - (8 + 1)$ .

$$\begin{aligned} (5 + 7) \div 2 \times 3 - (8 + 1) &= 12 \div 2 \times 3 - (8 + 1) && \text{Add inside the left parentheses.} \\ &= 12 \div 2 \times 3 - 9 && \text{Add inside the remaining parentheses.} \\ &= 6 \times 3 - 9 && \text{Divide.} \\ &= 18 - 9 && \text{Multiply.} \\ &= 9 && \text{Subtract.} \end{aligned}$$

### Example 2 Evaluate the expression $3x^2 - 4y$ if $x = 3$ and $y = 2$ .

$$\begin{aligned} 3x^2 - 4y &= 3(3)^2 - 4(2) && \text{Replace } x \text{ with } 3 \text{ and } y \text{ with } 2. \\ &= 3(9) - 4(2) && \text{Evaluate the power first.} \\ &= 27 - 8 && \text{Do all multiplications.} \\ &= 19 && \text{Subtract.} \end{aligned}$$

### Exercises

Evaluate each expression.

- |                                      |                                      |
|--------------------------------------|--------------------------------------|
| 1. $4 \times 5 + 8$ <b>28</b>        | 2. $16 - 12 \div 4$ <b>13</b>        |
| 3. $14 \div 2 + 3(5)$ <b>22</b>      | 4. $5 - 6 \times 2 \div 3$ <b>1</b>  |
| 5. $2 \cdot 3^2 + 10 - 14$ <b>14</b> | 6. $2^2 + 32 \div 8 - 5$ <b>3</b>    |
| 7. $(10 + 5) \div 3$ <b>5</b>        | 8. $5^2 \cdot (8 - 6)$ <b>50</b>     |
| 9. $(17 - 5)(6 + 5)$ <b>132</b>      | 10. $3 + 7(14 - 8 \div 2)$ <b>73</b> |
| 11. $5[24 - (6 + 8)]$ <b>50</b>      | 12. $\frac{14}{3^2 - 2}$ <b>2</b>    |

Evaluate each expression if  $a = 3$ ,  $b = 5$ , and  $c = 6$ .

- |                         |                          |                                  |
|-------------------------|--------------------------|----------------------------------|
| 13. $a + 3b$ <b>18</b>  | 14. $4b - 3c$ <b>2</b>   | 15. $2a - b + 5c$ <b>31</b>      |
| 16. $(ab)^2$ <b>225</b> | 17. $a(b + c)$ <b>33</b> | 18. $3(bc - 8) \div a$ <b>22</b> |