1-2 Study Guide and Intervention (continued)

Order of Operations

Evaluate Algebraic Expressions Algebraic expressions may contain more than one operation. Algebraic expressions can be evaluated if the values of the variables are known. First, replace the variables with their values. Then use the order of operations to calculate the value of the resulting numerical expression.

Example Evaluate $x^3 + 5(y - 3)$ if $x = 2$ and $y = 12$.

$$
\begin{aligned}
x^3 + 5(y - 3) &= 2^3 + 5(12 - 3) & &\text{Replace } x \text{ with 2 and } y \text{ with 12.} \\
&= 8 + 5(12 - 3) & &\text{Evaluate } 2^3. \\
&= 8 + 5(9) & &\text{Subtract 3 from 12.} \\
&= 8 + 45 & &\text{Multiply 5 and 9.} \\
&= 53 & &\text{Add 8 and 45.}
\end{aligned}
$$

The solution is 53.

Exercises

Evaluate each expression if $x = 2$, $y = 3$, $z = 4$, $a = \dfrac{4}{5}$, and $b = \dfrac{3}{5}$.

1. $x + 7$

2. $3x - 5$

3. $x + y^2$

4. $x^3 + y + z^2$

5. $6a + 8b$

6. $23 - (a + b)$

7. $\dfrac{y^2}{x^2}$

8. $2xyz + 5$

9. $x(2y + 3z)$

10. $(10x)^2 + 100a$

11. $\dfrac{3xy - 4}{7x}$

12. $a^2 + 2b$

13. $\dfrac{z^2 - y^2}{x^2}$

14. $6xz + 5xy$

15. $\dfrac{(z - y)^2}{x}$

16. $\dfrac{25ab + y}{xz}$

17. $\dfrac{5a^2b}{y}$

18. $(z \div x)^2 + ax$

19. $\left(\dfrac{x}{z}\right)^2 + \left(\dfrac{y}{z}\right)^2$

20. $\dfrac{x + z}{y + 2z}$

21. $\left(\dfrac{z \div x}{y}\right) + \left(\dfrac{y \div x}{z}\right)$