

ALGEBRAIC EXPRESSIONS

substitution

$$x + y$$

$$5 + 3 = 8$$

$$\text{FOR } x = 5 \text{ AND } y = 3$$

$$x + y$$

$$2 + (-6) = -4$$

$$\text{FOR } x = 2 \text{ AND } y = -6$$

$$2x =$$

$$\text{FOR } x = 6$$

$$2 \cdot 6 = 12$$

$$2 + y$$

$$2 - y$$

$$\frac{2}{y}$$

$$2y$$

FOUR OPERATION

$x + y \leftarrow$ ADDITION

$x - y \leftarrow$ SUBTRACTION

$\frac{x}{y} \leftarrow$ DIVISION

$xy \leftarrow$ MULTIPLICATION

$$2 \cdot 3x$$

$$\text{FOR } x = 4$$

$$2 \cdot 3 \cdot 4 = 24$$

Algebraic Expressions (Lsn5-1)

To evaluate an algebraic expression you replace each variable with its numerical value, then use the order of operations to simplify.

Example 1

Evaluate $6x - 7$ if $x = 8$.

$$\begin{aligned} 6x - 7 &= 6(8) - 7 \\ &= 48 - 7 \\ &= 41 \end{aligned}$$

Replace x with 8.
Use the order of operations.
Subtract 7 from 48.

Example 2

Evaluate $5m - 3n$ if $m = 6$ and $n = 5$.

$$\begin{aligned} 5m - 3n &= 5(6) - 3(5) \\ &= 30 - 15 \\ &= 15 \end{aligned}$$

Replace m with 6 and n with 5.
Use the order of operations.
Subtract 15 from 30.

Example 3

Evaluate $\frac{ab}{3}$ if $a = 7$ and $b = 6$.

$$\begin{aligned} \frac{ab}{3} &= \frac{(7)(6)}{3} \\ &= \frac{42}{3} \\ &= 14 \end{aligned}$$

Replace a with 7 and b with 6.
The fraction bar is like a grouping symbol.
Divide.

$$\frac{3(4)}{6} = \frac{12}{6} = 2$$

Example 4

Evaluate $x^3 + 4$ if $x = 3$.

$$\begin{aligned} x^3 + 4 &= 3^3 + 4 \\ &= 27 + 4 \\ &= 31 \end{aligned}$$

Replace x with 3.
Use the order of operations.
Add 27 and 4.

$$x^3 = x \cdot x \cdot x$$

$$2^3 = 2 \cdot 2 \cdot 2 = 8$$

Exercises

Evaluate each expression if $a = 4$, $b = 2$, and $c = 7$.

1. $3ac$

2. $5b^3$

3. abc

7. $\frac{b^4}{4}$

8. $c - a$

9. $20 - bc$

13. $7c$

14. $6a - b$

15. $ab - c$

Lesson 5-1 Skills Practice for Algebraic Expressions

Evaluate each expression if $w = 2$, $x = 3$, $y = 5$, and $z = 6$.

1. $2w$

3. $9 - z$

4. $x + w$

6. $6y - 5$

7. y^2

9. $\frac{z}{2}$

Evaluate each expression if $m = 3$, $n = 7$, and $p = 9$.

10. $m + n$

12. $5p$

13. $3.3p$

15. $2p + 3.3$

16. $20 + 2n$

18. $\frac{n}{7}$

19. n^2

21. $\frac{p^2}{3}$

22. $1.1 + n$

24. $3.6m$

25. $3n - 2m$

27. $2.1n + p$

28. $\frac{m^2}{p}$

30. $\frac{(n + 2)^2}{3}$