

LESSON

1.3

Order of Operations

BEFORE

You performed basic operations.

Now

You'll use order of operations to evaluate expressions.

WHY?

So you can find the height of a boojum, as in Ex. 28.

Vocabulary

order of operations,
p. 16

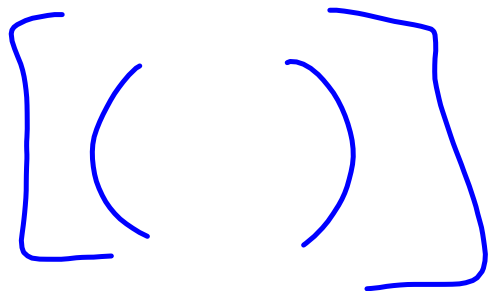
P E M D A S

To evaluate expressions involving more than one operation, mathematicians have agreed on a set of rules called the **order of operations**.

Order of Operations

1. Evaluate expressions inside grouping symbols.
2. Evaluate powers.
3. Multiply and divide from left to right.
4. Add and subtract from left to right.

Grouping Symbols Parentheses (), brackets [], and fraction bars are common grouping symbols. Grouping symbols indicate operations that should be performed first. For example, compare the expressions $3 \cdot 2 + 5$ and $3(2 + 5)$. To evaluate $3 \cdot 2 + 5$, you multiply first, then add. To evaluate $3(2 + 5)$, you add first, then multiply.



$$\begin{array}{l} 3(2+5) \\ 3(7) \\ 21 \end{array}$$

$$\begin{array}{l} 3 \cdot 2 + 5 \\ 6 + 5 \\ 11 \end{array}$$

LESSON

1.3

Name _____ Date _____

Practice A

For use with pages 16-21

Evaluate the expression.

1. $3 \cdot 8 + 7$

2. $21 - 4 \cdot 5$

3. $7 \cdot 8 - 19$

$$\begin{array}{r} 21 - 4 \cdot 5 \\ 21 - 20 \\ 1 \end{array}$$

4. $2 \cdot 6 + 11 \cdot 1$

$$\begin{array}{r} 2 \cdot 6 + 11 \cdot 1 \\ 12 + 11 \\ 23 \end{array}$$

5. $4 \cdot 9 - 3 \cdot 2$

6. $16 \div 4 - 24 \div 12$

$$\begin{array}{r} 16 \div 4 - 24 \div 12 \\ 4 - 2 \\ 2 \end{array}$$

7. $6 \cdot 5 - 18 \div 3$

8. $90 \div 5 - 3^2$

9. $\frac{13 + 11}{14 - 6}$

$$90 \div 5 - 3^2$$

$$90 \div 5 - 9$$

$$18 - 9$$

$$9$$

10. $26 - (4^2 - 8)$

11. $3[5 + (9 - 7)]$

12. $2(12 - 3 \cdot 4)$

$$3[5 + (9 - 7)]$$

$$3[5 + 2]$$

$$3(7)$$

$$21$$

13. Find the sum of 17 and 4 squared.

14. Find the difference of 78 and 7 squared.

$$78 - 7^2$$

$$78 - 49$$
$$29$$

Evaluate the expression when $x = 4$ and $y = 9$.

15. x^2

16. $6(x - 1)$

17. $7 + y \div 3$

18. $30 - 2y$

$$\begin{array}{l} x=4 \\ y=9 \end{array}$$

19. $3(x + y)^2$

$$\begin{array}{l} 3(4+9)^2 \\ 3(13)^2 \end{array}$$

$$\begin{array}{l} 3 \cdot 169 \\ 507 \end{array}$$

20. $xy \div 3$

21. $y^2 - x$

22. $2xy + 3x$

23. $0.5(y - 5)$

24. $1.4x - 4$

25. $\frac{y}{x-1}$

26. $\frac{38-x-y}{y-x}$

$$(38-4-9) \div (9-4) \quad \frac{38-x-y}{y-x}$$

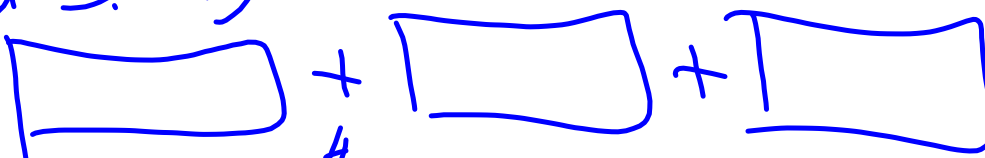
$$\frac{25}{5} \quad \frac{(38-4-9)}{(9-4)}$$

5

27. You are purchasing supplies for an art project. You need 3 containers of paint, 2 brushes, and 1 case of canvas. Each container of paint is \$3.99, each brush is \$3.80, and each case of canvas is \$15.99. Write and evaluate an expression for the total cost of the art supplies.

$$3x + 2y + z$$

$$3(3.99) + 2(3.80) + 15.99$$

 + +

\$35.56

- 28.** The formula to find the area A of a rectangle is $A = \ell w$, where ℓ is the length of the rectangle and w is the width of the rectangle. Find the total area of the garden.

