

1-2**Study Guide and Intervention*****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. $4 \times 5 + 8$ | 2. $16 - 12 \div 4$ |
| 3. $14 \div 2 + 3(5)$ | 4. $5 - 6 \times 2 \div 3$ |
| 5. $2 \cdot 3^2 + 10 - 14$ | 6. $2^2 + 32 \div 8 - 5$ |
| 7. $(10 + 5) \div 3$ | 8. $5^2 \cdot (8 - 6)$ |
| 9. $(17 - 5)(6 + 5)$ | 10. $3 + 7(14 - 8 \div 2)$ |
| 11. $5[24 - (6 + 8)]$ | 12. $\frac{14}{3^2 - 2}$ |

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

- | | | |
|--------------|----------------|------------------------|
| 13. $a + 3b$ | 14. $4b - 3c$ | 15. $2a - b + 5c$ |
| 16. $(ab)^2$ | 17. $a(b + c)$ | 18. $3(bc - 8) \div a$ |

1-2**Skills Practice*****Variables, Expressions, and Properties*****Evaluate each expression.**

1. $10 \div 2 + 8$

2. $4(9) - 36 \div 3$

3. $24 - 12 \div 4$

4. $25 + 2 \cdot 8 \div 4$

5. $49 - (3^2 + 8 \cdot 3)$

6. $2(20 - 5) + \frac{34 - 14}{4}$

7. $(27 + 24)(27 - 24)$

8. $2^3 \div 4 + 3 \times 6$

9. $(4 + 4) \cdot 4 + 4 \div 4$

10. $3[(8 - 2) - 5] + 7$

11. $\frac{28 - 7}{4^2 - 13}$

12. $(15 - 9)^2 \div (5 + 4)$

Evaluate each expression if $n = 4$, $p = 3$, and $t = 6$.

13. $3n + p$

14. $t - 2p$

15. $3p - n + 4$

16. $(np)^2$

17. np^2

18. $5(2t - n)$

19. $p(n + t)$

20. $6t^2 - t$

21. $\frac{npt}{3}$

22. $4(pt - 3) \div n$

23. $\frac{p^2 + 4}{3t - 5}$

24. $\frac{pn^2}{t + 10}$

25. $n^2 - 3n + 8$

26. $2t^2 - t + 9$

Name the property shown by each statement.

27. $(4 + 5)3 = 4(3) + 5(3)$

28. $1 \cdot x^2 = x^2$

29. $2(bc) = (2b)c$

30. $(6 + 2) + 5 = 6 + (2 + 5)$

31. $2(bc) = 2(cb)$

32. $(4 + 5) + 0 = 4 + 5$

33. $13 + (5 + 10) = (5 + 10) + 13$

34. $3(7 - 2) = 3(7) - 3(2)$

1-2**Practice*****Variables, Expressions, and Properties***

Evaluate each expression if $r = 3$, $s = 5$, and $t = 2$.

1. $3r + s$

2. $4s - 5t$

3. $8 + 6t - r$

4. rs^2

5. $(st)^2$

6. $\frac{r^2 + 1}{t + 3}$

7. $s(7 + t) - r$

8. $2s^2 - 8s + 3$

Name the property shown by each statement.

9. $6(5 + 1) = 6(5) + 6(1)$

10. $1(2 + 3) = 2 + 3$

11. $(10 + 7) + 4 = 10 + (7 + 4)$

12. $5 + (1 + 9) = 5 + (9 + 1)$

State whether each conjecture is *true* or *false*. If *false*, provide a counter example.

13. The sum of an even number and an odd number is always even.

14. Multiplication of whole numbers is associative.

Rewrite each expression using the indicated property.

15. $(x + 7) + 3$, Associative Property

16. $5(3) + 5(4)$, Distributive Property

17. **INTERNET** A bookstore offers wireless Internet access to its customers for a charge. The cost of using this service is given by the expression $\$1.50 + \frac{m}{20}$, where m is the number of minutes online. How much would it cost to be online 40 minutes?

18. **TEMPERATURE** When a temperature in degrees Celsius C is known, the expression $\frac{9C + 160}{5}$ can be used to find the temperature in degrees Fahrenheit. If a thermometer shows that a temperature is 20°C , what is the temperature in degrees Fahrenheit?

1-3**Practice*****Integers and Absolute Value***

Replace each \bullet with $<$, $>$, or $=$ to make a true sentence.

1. $0 \bullet 8$

2. $-5 \bullet -3$

3. $1 \bullet -7$

4. $-4 \bullet -4$

5. $-12 \bullet 10$

6. $5 \bullet -6$

7. $-6 \bullet -7$

8. $0 \bullet -8$

9. $-10 \bullet -10$

Order each set of integers from least to greatest.

10. $\{-5, -7, 0, 5, 7\}$

11. $\{-1, 2, -3, 4\}$

12. $\{-2, -4, -6, -8, -10, -12\}$

13. $\{0, -9, -3, -7, 1, -1\}$

Evaluate each expression.

14. $|-19|$

15. $|15|$

16. $|0|$

17. $|-1| + |3|$

18. $|-19| + |-8|$

19. $|-12| - |4|$

Evaluate each expression if $k = 4$, $m = -2$, $n = 7$, and $p = -5$.

20. $|m| + 6$

21. $n - |p|$

22. $k + |p|$

23. $5|n| + k$

24. $|n| - 4$

25. $9|m| - 14$

TEMPERATURE For Exercises 26 and 28, use the following information.

During a five-day cold spell, Jose recorded the temperature each day at noon. The temperature was -3°F on Monday, -5°F on Tuesday, -4°F on Wednesday, -1°F on Thursday, and 0°F on Friday.

26. On which day was it the coldest at noon?

27. On which day was it the warmest at noon?

28. The temperature at noon on Saturday was 25° warmer than the temperature on Tuesday. What was the temperature on Saturday? Justify your answer using a number line.

