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1-5 Algebra: Variables and Expressions - Practice and Problem Solving

Evaluate each expression if $m = 2$ and $n = 16$.

9. $n + 8$

$$n + 8 = 16 + 8$$
$$= 24$$

11. $22 - n$

$$22 - n = 22 - 16$$
$$= 6$$

13. $12 \div m$

$$12 \div m = 12 \div 2$$
$$= 6$$

15. $6 \cdot m$

$$6 \cdot m = 6 \cdot 2$$
$$= 12$$

17. $n + m$

$$n + m = 16 + 2$$
$$= 18$$

19. $m - 1$

$$m - 1 = 2 - 1$$
$$= 1$$

Evaluate each expression if $a = 4$, $b = 7$, and $c = 11$.

21. $c - b$

$$c - b = 11 - 7$$
$$= 4$$

23. $2b + 7$

$$2b + 7 = 2 \times 7 + 7$$
$$= 14 + 7$$
$$= 21$$

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25. $4b - 10$

$$\begin{aligned} 4b - 10 &= 4 \times 7 - 10 \\ &= 28 - 10 \\ &= 18 \end{aligned}$$

27. **RACING** To find the average speed of a racecar, use the expression $d \div t$, where d represents distance and t represents time. Find the speed s of a racecar that travels 508 miles in 4 hours.

$$\begin{aligned} d \div t &= 508 \div 4 \\ &= 127 \end{aligned}$$

The average speed s of the racecar is 127 miles per hour.

Evaluate each expression if $a = 4$, $b = 15$, and $c = 9$.

29. $b^2 - 5c$

$$\begin{aligned} b^2 - 5c &= 15^2 - 5 \times 9 \\ &= 225 - 5 \times 9 \\ &= 225 - 45 \\ &= 180 \end{aligned}$$

31. $4b \div 5$

$$\begin{aligned} 4b \div 5 &= 4 \times 15 \div 5 \\ &= 60 \div 5 \\ &= 12 \end{aligned}$$

33. $2ac$

$$\begin{aligned} 2ac &= 2 \times 4 \times 9 \\ &= 8 \times 9 \\ &= 72 \end{aligned}$$

35. What is the value of $st \div 6r$ if $r = 5$, $s = 32$, and $t = 45$?

$$\begin{aligned} st \div 6r &= 32 \times 45 \div 6 \times 5 \\ &= 1,440 \div 6 \times 5 \\ &= 240 \times 5 \\ &= 1,200 \end{aligned}$$

Evaluate each expression if $x = 3$, $y = 12$, and $z = 8$.

37. $4z + 8 - 6$

$$\begin{aligned} 4z + 8 - 6 &= 4 \times 8 + 8 - 6 \\ &= 32 + 8 - 6 \\ &= 40 - 6 \\ &= 34 \end{aligned}$$

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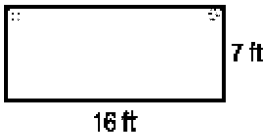
39. $15 + 9x \div 3$

$$\begin{aligned} 15 + 9x \div 3 &= 15 + 9 \times 3 \div 3 \\ &= 15 + 27 \div 3 \\ &= 15 + 9 \\ &= 24 \end{aligned}$$

41. $y^2 \div (3z)$

$$\begin{aligned} y^2 \div (3 \cdot z) &= 12^2 \div (3 \cdot 8) \\ &= 12^2 \div 24 \\ &= 144 \div 24 \\ &= 6 \end{aligned}$$

43. **GEOMETRY** To find the area of a rectangle, use the expression lw, where l represents the length, and w represents width of the rectangle. What is the area of the rectangle shown?



$$\begin{aligned} lw &= 16 \text{ ft} \times 7 \text{ ft} \\ &= 112 \text{ ft}^2 \end{aligned}$$

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45. **ANALYZE TABLES** To change a temperature given in degrees Celsius to degrees Fahrenheit, first multiply the Celsius temperature by 9. Next, divide the answer by 5. Finally, add 32 to the result. Write an expression that can be used to change a temperature from degrees Celsius to degrees Fahrenheit. Then use the information in the table below to find the difference in average temperatures in degrees Fahrenheit for San Antonio from January to April. (*Hint:* Convert to degrees Fahrenheit first.)

Average Monthly Temperature for San Antonio, Texas	
Month	**Temp. (°C)**
January	10
April	20
July	29

Source: infoplease.com

$9 \times c \div 5 + 32$

January:

$$9 \times c \div 5 + 32 = 9 \times 10 \div 5 + 32$$
$$= 90 \div 5 + 32$$
$$= 18 + 32$$
$$= 50°$$

April:

$$9 \times c \div 5 + 32 = 9 \times 20 \div 5 + 32$$
$$= 180 \div 5 + 32$$
$$= 36 + 32$$
$$= 68°$$

Find the difference: $68° - 50° = 18°$

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47. **CHALLENGE** Marcus and Yvette each have a calculator. Yvette starts at 100 and subtracts 7 each time. Marcus starts at zero and adds 3 each time. Suppose Marcus and Yvette press the keys at the same time. Will their displays ever show the same number? If so, what is the number? Explain your reasoning.

Explore: Yvette starts at 100 and subtracts 7 each time. Marcus starts at 0 and adds 3 each time. We want to know whether they will ever get the same number at the same time.
Plan: Make a table. Find the numbers that result from operations described. Use a calculator to find these numbers.

Number of operations	Marcus	Yvette
1	3	93
2	6	86
3	9	79
4	12	72
5	15	65
6	18	58
7	21	51
8	24	44
9	27	37
10	30	30

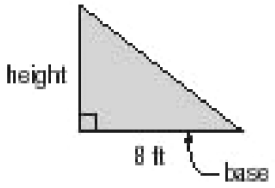
Yes; the calculators will display 30 at the same time.
Check: The answer makes sense because
$0+10\times3=30$ *and* $100-10\times7=30$.

49. **Which One Doesn't Belong?** Identify the expression that does not belong with the other three. Explain your reasoning.

$7y$	$6+8$	xy	$3a+2$

6 + 8; It contains no variable.

51. The height of the triangle below can be found using the expression $48 \div b$ where b is the base of the triangle. Find the height of the triangle.



A 4 ft
B 6 ft
C 8 ft
D 10 ft

$48 \div 8 = 6$
The correct answer is B.

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53. The table shows the total medal counts for different countries from the 2006 Winter Olympic games.

Total Medal Count	
Country	Number of Medals
Germany	29
United States	25
Canada	x
Austria	23
Russia	22
Norway	19

Source: International Olympic Committee

Which expression represents the total number of medals earned by all the countries listed in the table?
F $118 - x$
G $2x + 118$
H $x - 118$
J $118 + x$

The total number of medals earned can be written as $118 + x$, so the correct answer is J.

Find the value of each expression.

55. $5^2 + (20 \div 2) - 7$

$$\begin{aligned} 5^2 + (20 \div 2) - 7 &= 5^2 + 10 - 7 \\ &= 25 + 10 - 7 \\ &= 35 - 7 \\ &= 28 \end{aligned}$$

57. **LANGUAGE** An estimated 10^9 people in the world speak Mandarin Chinese. About how many people speak this language?

$$\begin{aligned} 10^9 &= 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \\ &= 1,000,000,000 \text{ people} \end{aligned}$$

PREREQUISITE SKILL Add or subtract.

59. $18 - 9$

$18 - 9 = 9$

61. $14 + 7$

$14 + 7 = 21$