

# Why Was the Mural Painter in the News?

Solve each formula below for the indicated letter. Assume that all variables represent nonnegative numbers. CIRCLE the letter next to the correct answer. Write this letter in the box at the bottom of the page that contains the number of that exercise.

$A = s^2; s$	$r = \sqrt{\frac{A}{\pi}}; A$	$s = \frac{at^2}{2}; t$	$v = \sqrt{\frac{Fr}{m}}; F$	$c = \sqrt{a^2 + b^2}; a$															
(E) $s = \sqrt{A}$	(O) $A = 2\pi r$	(L) $t = 2\sqrt{sa}$	(P) $F = \frac{mv^2}{r}$	(U) $a = \sqrt{c^2 + b^2}$															
① (R) $s = 2A$	⑤ (U) $A = \pi r^2$	⑨ (D) $t = \sqrt{\frac{2s}{a}}$	⑬ (R) $F = \frac{mr}{v^2}$	⑰ (1) $a = \sqrt{c^2 - b^2}$															
$E = mc^2; c$	$I = \sqrt{\frac{P}{R}}; P$	$k = \frac{1}{2}mv^2; v$	$d = \sqrt{\frac{4A}{\pi}}; A$	$a = \sqrt{x^2 + y^2}; y$															
(P) $c = \sqrt{Em}$	(G) $P = IR^2$	(H) $v = \sqrt{\frac{2k}{m}}$	(1) $A = \frac{\pi d^2}{4}$	(B) $y = \sqrt{a^2 - x^2}$															
② (N) $c = \sqrt{\frac{E}{m}}$	⑥ (C) $P = I^2 R$	⑩ (B) $v = \sqrt{\frac{2m}{k}}$	⑭ (U) $A = 2\pi d^2$	⑱ (S) $y = \sqrt{(a+x)^2}$															
$s = 16t^2; t$	$I = \sqrt{\frac{P}{R}}; R$	$v = \frac{\pi r^2 h}{3}; r$	$h = 3\sqrt{2k}; k$	$r = \frac{1}{2}\sqrt{\frac{S}{\pi}}; S$															
(M) $t = \sqrt{\frac{s}{8}}$	(A) $R = P I^2$	(L) $r = \sqrt{\frac{3V}{\pi h}}$	(A) $k = \frac{h^2}{18}$	(F) $S = \frac{\pi r^2}{2}$															
③ (C) $t = \frac{\sqrt{s}}{4}$	⑦ (E) $R = \frac{P}{I^2}$	⑪ (F) $r = \sqrt{\frac{3\pi V h}{v}}$	⑮ (1) $k = 9h^2$	⑲ (M) $S = 4\pi r^2$															
$V = \pi r^2 h; r$	$w = \sqrt{\frac{V}{h}}; h$	$s = \frac{kbd^2}{\ell}; d$	$T = 2\pi\sqrt{\frac{\ell}{g}}; \ell$	$F = \frac{km_1 m_2}{d^2}; d$															
(A) $r = \sqrt{\frac{V}{\pi h}}$	(N) $h = \frac{V}{w^2}$	(T) $d = \sqrt{\frac{ks}{\ell b}}$	(T) $\ell = 4\pi g T^2$	(E) $d = \sqrt{\frac{km_1 m_2}{F}}$															
④ (L) $r = \sqrt{\frac{Vh}{\pi}}$	⑧ (T) $h = \frac{V}{w}$	⑫ (E) $d = \sqrt{\frac{\ell s}{kb}}$	⑯ (S) $\ell = \frac{gT^2}{4\pi^2}$	⑳ (1) $d = \sqrt{\frac{Fkm_1 m_2}{F}}$															
10	7	19	15	9	1	4	16	6	20	2	12	17	8	13	5	18	11	14	3

OBJECTIVE 4-1: To solve a formula for a given letter (either squaring both sides or taking the square root of both sides is necessary).

# MASTERING THE STANDARDS

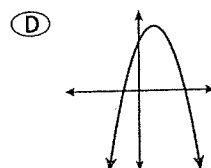
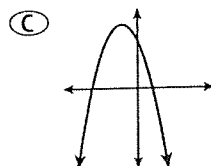
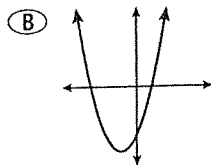
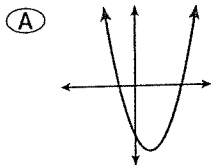
## CUMULATIVE ASSESSMENT, CHAPTERS 1-11

### Multiple Choice

1. Which of the following is the simplified form of the expression  $\frac{x^2 - 3x + 2}{x^2 - 4}$ ?

(A)  $\frac{x-1}{x-2}$                       (C)  $\frac{x+1}{x+2}$   
 (B)  $\frac{x-1}{x+2}$                       (D)  $\frac{x+1}{x-2}$

2. Which of these is the graph of  $y = x^2 - 2x - 3$ ?



3. Which property is illustrated by the equation  $3(w + 4) = 3w + 12$ ?

(A) Associative Property of Addition  
 (B) Associative Property of Multiplication  
 (C) Commutative Property of Multiplication  
 (D) Distributive Property

4. Which expression is equivalent to  $(m^2 m^{\frac{1}{2}})^6$ ?

(A)  $m^{\frac{5}{2}}$                       (C)  $m^{\frac{15}{2}}$   
 (B)  $m^6$                       (D)  $m^{15}$

5. Which line passes through the point  $(-4, -3)$  and is perpendicular to the line  $3x + y = -5$ ?

(A)  $3x + y = -15$   
 (B)  $3x - y = -15$   
 (C)  $x - 3y = 5$   
 (D)  $x + 3y = 5$

6. Leah graphed a quadratic function that intersected the  $x$ -axis at two points. Which function could she have graphed?

(A)  $y = x^2 - 6x + 9$   
 (B)  $y = x^2 + 2x - 24$   
 (C)  $y = x^2 + 10x + 25$   
 (D)  $y = x^2 + x + 4$

7. What is the solution to the system of equations below?

$$\begin{cases} 2x - y = 2 \\ y = 3x - 5 \end{cases}$$

(A)  $(4, 6)$                       (C)  $(2, 1)$   
 (B)  $(3, 4)$                       (D)  $(0, 2)$

8. What is the complete factorization of  $2x^3 + 18x$ ?

(A)  $2x(x^2 + 9)$   
 (B)  $2x(x + 3)^2$   
 (C)  $2x(x + 3)(x - 3)$   
 (D)  $2(x^3 + 18)$

9. What is the product of  $2x - 5$  and  $3x + 2$ ?

(A)  $6x^2 - 4x - 10$   
 (B)  $6x^2 - 11x - 10$   
 (C)  $6x^2 - 15x - 10$   
 (D)  $6x^2 - 19x - 10$

When a test item gives an equation to be solved, it may be quicker to work backward from the answer choices by substituting them into the equation. If time remains, check your answer by solving the equation.

10. Which shows the product of  $5.1 \times 10^4$  and  $3 \times 10^9$  written in scientific notation?

- (A)  $1.53 \times 10^{12}$
- (B)  $1.53 \times 10^{14}$
- (C)  $15.3 \times 10^{12}$
- (D)  $15.3 \times 10^{13}$

11. Which functions have all real numbers as their domain?

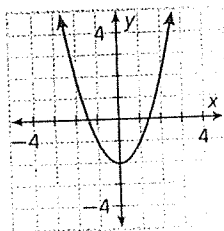
- I  $y = \frac{1}{x+1}$
- II  $y = (x+1)^2$
- III  $y = |x+1|$

- (A) I only
- (B) I and II
- (C) II and III
- (D) I, II, and III

### Extended Response

12. Use the Quadratic Formula to find the positive solution of  $3x^2 - 8x - 2 = 0$ . Round your answer to the nearest tenth.

13. The graph of  $f(x)$  is shown below. How many zeros does  $f(x)$  have?



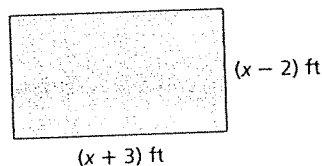
14. Scott is finding the equation of the line that has an x-intercept of  $-4$  and a y-intercept of  $3$ . He writes the equation in the form  $Ax + By = 12$ . What value should he use for  $B$ ?
15. Tonya graphs the lines described by  $x + 2y = -2$  and  $-x + 3y = -8$ . What is the x-coordinate of the point of intersection of the lines?

### Short Response

16. A chemist has 400 milliliters of a solution that is 50% alcohol. She wants to add alcohol to the solution to make a solution that is 75% alcohol.
- Write an equation that you can use to find out how many milliliters of alcohol the chemist should add to the solution. Be sure to explain what any variables represent.
  - Solve the equation to determine the number of milliliters of alcohol the chemist should add. Show your work.
17. Ella and Mia went on a camping trip. The total cost for their trip was \$124, which the girls divided evenly. Ella paid for 4 nights at the campsite and \$30 for supplies. Mia paid for 2 nights at the campsite and \$46 for supplies.
- Write an equation that could be used to find the cost of one night's stay at the campsite. Explain what each variable in your equation represents.
  - Solve your equation from part a to find the cost of one night's stay at the campsite. Show your work.

### Extended Response

18. The figure gives the dimensions of a rectangular flower bed.



- The area of the flower bed is  $24 \text{ ft}^2$ . Use the formula for the area of a rectangle to write an equation based on the figure.
- Multiply the binomials in your equation and simplify to write a new equation in the form  $ax^2 + bx + c = 0$ .
- Solve the equation. Show your work. Do all of the solutions make sense in this situation? Explain.
- What are the length and width of the flower bed?

## CHAPTER TEST

Do only the  
circled  
problems

Find the domain of each square-root function.

1.  $y = 6 + \sqrt{x}$

2.  $y = -2\sqrt{x+9}$

3.  $y = x + \sqrt{3x-3}$

Graph each square-root function.

4.  $y = \sqrt{x} + 2$

5.  $y = \sqrt{x-1}$

6.  $y = -3\sqrt{2x}$

Simplify. All variables represent nonnegative numbers.

7.  $\sqrt{27}$

8.  $\sqrt{75m^4}$

9.  $\sqrt{\frac{x^6}{y^2}}$

10.  $\sqrt{\frac{p^9}{144p}}$

11.  $4\sqrt{10} - 2\sqrt{10}$

12.  $5\sqrt{3y} + \sqrt{3y}$

13.  $\sqrt{8} - \sqrt{50}$

14.  $2\sqrt{75} - \sqrt{32} + \sqrt{48}$

15.  $\sqrt{2}\sqrt{3m}$

16.  $\frac{\sqrt{128d}}{\sqrt{5}}$

17.  $\sqrt{3}(\sqrt{21} - 2)$

18.  $(\sqrt{3} - 2)(\sqrt{3} + 4)$

Solve each equation. Check your answer.

19.  $\sqrt{2x} = 6$

20.  $\sqrt{3x+4} - 2 = 5$

21.  $\frac{2\sqrt{x}}{3} = 8$

22.  $\sqrt{5x+1} = \sqrt{2x-2}$

Find the next three terms in each geometric sequence.

23. 2, 6, 18, 54, ...

24. 4800, 2400, 1200, 600, ...

25. -4, 20, -100, 500, ...

26. **Communication** If school is cancelled, the school secretary calls 2 families. Each of those families calls 2 other families. In the third round of calls, each of the 4 families calls 2 more families. If this pattern continues, how many families are called in the seventh round of calls?

Graph each exponential function.

27.  $y = -2(4)^x$

28.  $y = 3(2)^x$

29.  $y = 4\left(\frac{1}{2}\right)^x$

30.  $-\left(\frac{1}{3}\right)^x$

31. A teacher is repeatedly enlarging a diagram on a photocopier. The function  $f(x) = 3(1.25)^x$  represents the length of the diagram, in centimeters, after  $x$  enlargements. What is the length after 5 enlargements? Round to the nearest centimeter.
32. Chelsea invested \$5600 at a rate of 3.6% compounded quarterly. Write a compound interest function to model the situation. Then find the balance after 6 years.
33. The number of trees in a forest is decreasing at a rate of 5% per year. The forest had 24,000 trees 15 years ago. Write an exponential decay function to model the situation. Then find the number of trees now.

Look for a pattern in each data set to determine which kind of model best describes the data.

34.  $\{(-10, -17), (-5, -7), (0, 3), (5, 13), (10, 23)\}$

35.  $\{(1, 3), (2, 9), (3, 27), (4, 81), (5, 243)\}$

36. Use the data in the table to describe how the bacteria population is changing. Then write a function that models the data. Use your function to predict the bacteria population after 10 hours.

Bacteria Population				
Time (h)	0	1	2	3
Bacteria	6	18	54	162