

Write the letter for the correct answer in the blank at the right of each question.

1. Find the value of  $5 + 4 \cdot 3 \div 6 - 1$ .  $5 + 12 \div 6 - 1$   
 $5 + 2 - 1 = 7 - 1 = 6$

A.  $\frac{7}{2}$       B.  $\frac{27}{5}$       C. 6      D.  $\frac{17}{5}$       1. C

2. Evaluate  $2b(4a - c^2)$  if  $a = 5$ ,  $b = \frac{3}{2}$ , and  $c = 11$ .  $2(\frac{3}{2})(4(5) - 11^2)$   
 $3(20 - 121)$   
 $3(-101)$   
 $= -303$

A. -303      B. 423      C. -6      D.  $-\frac{303}{2}$       2. A

3. Evaluate  $-|3c - d|$  if  $c = -1$  and  $d = 5$ .  $-|3(-1) - 5|$   
 $= -|-3 - 5|$   
 $= -|-8| = -8$

A. 8      B. 2      C. -7      D. -8      3. D

4. The formula for the surface area of a sphere is  $A = 4\pi r^2$ , where  $r$  is the length of the radius. Find the surface area of the sphere with the radius of 14 feet. Use  $\frac{22}{7}$  for  $\pi$ .  $4(\frac{22}{7})(14^2) = \frac{17248}{7} = 2464$

A. 7248 ft<sup>2</sup>      B. 7744 ft<sup>2</sup>      C. 2464 ft<sup>2</sup>      D. 704 ft<sup>2</sup>      4. C

5. Name the sets of numbers to which  $-\frac{1}{3}$  belongs.

A. naturals, rationals      B. rational, reals  
 C. integers, rationals      D. integers, rationals, reals

5. B

6. Simplify  $\frac{1}{3}(15x - 9) + \frac{1}{5}(25x + 5)$ .  $= 5x - 3 + 5x + 1 = 10x - 2$

A.  $10x - 2$       B.  $\frac{64}{3}x - \frac{32}{15}$       C.  $5x - 2$       D.  $\frac{1}{5}(40x - 4)$       6. A

7. Name the property illustrated by  $5(x + y) = 5(y + x)$ .

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

7. C

8.  $23 = 5 - \frac{2}{3}m$   $(-\frac{3}{2})18 = -\frac{2}{3}m(\frac{3}{2})$

A. -42      B. -12      C. -27      D. 42      8. C

$-27 = m$

$$6 = |4x - 10|$$

9.  $18 = 3|4x - 10|$

- A. {1, -1}    B. {1, 4}    C. {4, -4}    D. {4}

9. B

10.  $5(2x - 6) = 7x - 3$

- A. -9    B. 9    C. 11    D.  $\emptyset$

10. B

11.  $|x - 3| + 10 = 2$

- A. {-5}    B. {-5, 11}    C. {11}    D.  $\emptyset$

11. D

12. Jamie is 4 years younger than her brother. Five years from now, the sum of their ages will be 32. Find Jamie's present age.

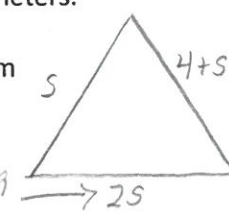
- A. 9    B. 10    C. 13    D. 14

$J = B - 4 + 5$   
 $B = B + 5$   
 $B - 4 + 5 + B + 5 = 32$   
 $2B + 6 = 32$   
 $2B = 26$   
 $B = 13$   
 $J = 9$

12. A

13. One side of a triangle is four centimeters longer than the shortest side. The third side of the triangle is twice as long as the shortest side. Find the length of the longest side of the triangle if its perimeter is 40 centimeters.

- A. 9 cm    B. 13 cm    C. 24 cm    D. 18 cm



13. D

14.  $0.38 > \frac{2x - 7}{5}$

- A.  $\{x < 4.45\}$     B.  $\{x < 98.5\}$     C.  $\{x < 13\}$     D.  $\{x < 3.69\}$

$1.9 > 2x - 7$   
 $8.9 > 2x$   
 $x < 4.45$

14. A

15.  $9 \leq 7 - x \leq -1$

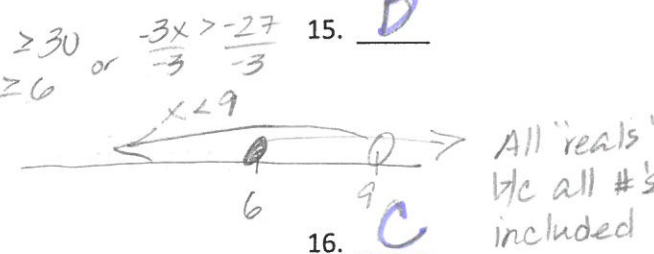
- A.  $\{-2 \leq x \leq 8\}$     B.  $\emptyset$     C.  $\{x \leq -2 \text{ or } x \geq 8\}$     D.  $\{x \leq -2\}$



15. B

16.  $5x - 4 \geq 26 \text{ or } 29 - 3x > 2$

- A.  $\{6 \leq x < 9\}$     B.  $\{x \leq 6 \text{ or } x > 9\}$     C. all real numbers    D.  $\{x \neq 9\}$



16. C

17.  $|2x - 3| \leq 7$

- A.  $\{x \leq 5\}$     B.  $\{-5 \leq x \leq 5\}$     C.  $\{-2 \leq x \leq 5\}$     D. all real numbers

17. C

$2x - 3 \leq 7$  ;  $2x - 3 \geq -7$   
 $2x \leq 10$      $2x \geq -4$   
 $x \leq 5$  ;  $x \geq -2$

$$|m+7| > 4$$

great "or" means "or"

18.  $2|m + 7| > 8$

$$m+7 > 4 \text{ or } m+7 < -4$$

$$m > -3 \text{ or } m < -11$$

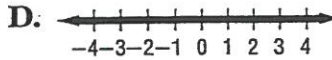
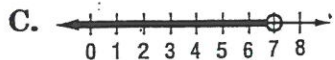
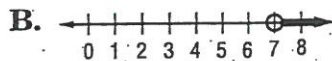
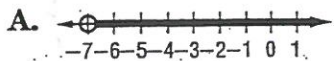
- A.  $\{-11 < m < -3\}$       B. All real numbers  
 C.  $\{m < -13 \text{ or } m > -1\}$       D.  $\{m < -11 \text{ or } m > -3\}$

18. D

19. Identify the graph of the solution set of  $-2.3 < 4 + 0.9y$ .

$$\frac{-6.3 < .9y}{.9 \quad .9}$$

$$y > -7$$



19. A

20. One number is four times a second number. If you take one-half of the second number and increase it by the first number, the result is at least 45. Find the least possible value for the second number.

$$x = 4x$$

$$\frac{x}{2} + 4x \geq 45$$

- A. 10      B. 9      C. 11      D. 12

$$\frac{x}{2} + \frac{8x}{2} \geq 45$$

20. A

21. Simplify  $\frac{x^2 + 3x - 18}{x^2 - 8x + 15}$  Assume that the denominator is not equal to 0.

$$\frac{9x}{2} \geq 45$$

$$9x \geq 90$$

$$x \geq 10$$

- A.  $\frac{x-6}{x+5}$       B.  $\frac{x+6}{x-5}$       C.  $\frac{x-3}{x-5}$       D.  $\frac{x-6}{x+3}$

$$\frac{(x+6)(x-3)}{(x-5)(x-3)}$$

21. B

22. Simplify  $\sqrt{25p^4q^2}$

$$= 5p^2|q|$$

- A.  $5|p^2|q$       B.  $5p^2q$       C.  $\pm 5p^2q$       D.  $5p^2|q|$

22. D

23. Use a calculator to approximate  $\sqrt[3]{160}$  to three decimal places.

- A. 3.556      B. 12.649      C. 3.557      D. 5.429

23. C

24. Simplify  $\sqrt[3]{256t^4}$

$$\sqrt[3]{64 \cdot 4 \cdot t^3 \cdot t} = 4t \sqrt[3]{4t}$$

- A.  $4t^3\sqrt[3]{4t}$       B.  $16t^3\sqrt[3]{t}$       C.  $\pm 4t^3\sqrt[3]{4t}$       D.  $4t\sqrt[3]{4t}$

24. A

25. Simplify  $\frac{5}{2-\sqrt{3}} \cdot \frac{(2+\sqrt{3})}{(2+\sqrt{3})} = \frac{10+5\sqrt{3}}{4-3} = \frac{10+5\sqrt{3}}{1}$

- A.  $10 + 5\sqrt{3}$       B.  $10 - 5\sqrt{3}$       C.  $-10 - 5\sqrt{3}$       D.  $-10 + 5\sqrt{3}$

25. A

26. Write the radical  $\sqrt[5]{m^3}$  using rational exponents.  $m^{\frac{3}{5}}$

A.  $m^2$       B.  $m^{\frac{5}{3}}$       C.  $m^{\frac{3}{5}}$       D.  $m^{15}$       26. C

27. Simplify the expression  $\frac{t^{\frac{3}{4}}}{t^{\frac{1}{5}}}$   $t^{\frac{3}{4} - \frac{1}{5}} = t^{\frac{15}{20} - \frac{4}{20}} = t^{\frac{11}{20}}$

A.  $t^{-2}$       B.  $t^{\frac{11}{20}}$       C.  $t^{\frac{19}{20}}$       D.  $t^{\frac{3}{20}}$       27. B

28. A correct step in the solution of the equation  $(5z - 1)^{\frac{1}{3}} - 3 = 1$  is \_\_\_\_\_.

A.  $5z - 1 = 4^{\frac{1}{3}}$       B.  $(5z - 1) - 27 = 1$   $(5z - 1)^{\frac{1}{3}} = 4$   
 $(5z - 1) = 64$

C.  $(5z - 1) - 9 = 3$       D.  $5z - 1 = 64$       28. D

29. Solve  $\sqrt{3x + 6} - 1 \geq 5$ .

A.  $x \geq 0$       B.  $-2 \leq x \leq 10$       C.  $x \geq 10$       D.  $x \geq -2$       29. C

30. Simplify  $(15 - 13i) - (-1 + 17i)$ .  $15 - 13i + 1 - 17i = 16 - 30i$

A.  $16 - 30i$       B.  $16 + 4i$       C.  $16 + 30i$       D.  $46$       30. A

31. Simplify  $\frac{(1+2i)(2+3i)}{(2-3i)(2+3i)} = \frac{2+7i+6i^2}{4-9i^2} = \frac{-4+7i}{13}$

A.  $\frac{8}{7} + \frac{1}{7}i$       B.  $\frac{8}{7} + i$       C.  $-4 + 7i$       D.  $-\frac{4}{13} + \frac{7}{13}i$       31. D

32. Simplify  $(3x^0y^{-4})(2x^2y)^3$ .  $3y^{-4}(8x^6y^3) = 24x^6y^{-1} = \frac{24x^6}{y}$

A.  $\frac{24x^6}{y}$       B.  $\frac{216x^6}{y^9}$       C.  $24x^5$       D.  $\frac{6x^6}{y}$       32. A

33. Simplify  $\frac{2x^2y^5z^{-4}}{8x^6yz^3}$ . Assume that no variable equals 0.  $\frac{1y^4}{4x^4z^7}$

A.  $\frac{y^4}{4x^4z}$       B.  $\frac{y^4}{6x^4z^7}$       C.  $\frac{y^4}{4x^4z^7}$       D.  $\frac{y^4z}{4x^4}$       33. C

34. Saturn is approximately  $1.4 \times 10^9$  kilometers from the Sun. If light travels at approximately  $3.0 \times 10^5$  kilometers per second, how long does it take light from the Sun to reach Saturn? Express your answer in scientific notation.

A.  $4.7 \times 10^4$  s      B. 4700 s      C.  $4.7 \times 10^3$  s      D.  $47 \times 10^3$  s      34. C

$r \cdot t = d$

$\frac{3.0 \times 10^5 \cdot t = 1.4 \times 10^9}{3.0 \times 10^5 \quad 3.0 \times 10^5}$

$t = 4.7 \times 10^3$

35. Simplify  $(7x^3 - 2x^2 + 3) + (x^2 - x - 5)$ .

$$7x^3 - x^2 - x - 2$$

- A.  $7x^3 - 2x^2 - x - 2$       B.  $7x^3 - 3x^2 - 2$   
 C.  $8x^5 - 3x^3 - 2$       D.  $7x^3 - x^2 - x - 2$

35. D

36. Simplify  $(5x - 4)^2$ .

$$(5x-4)(5x-4) = 25x^2 - 20x - 20x + 16$$

- A.  $25x^2 - 16$       B.  $25x^2 - 20x + 16$   
 C.  $25x^2 - 40x + 16$       D.  $25x^2 - 18x + 16$

$$25x^2 - 40x + 16$$

36. C

37. Simplify  $(6x^3 - 16x^2 + 11x - 5) \div (3x - 2)$ .

$$\begin{array}{r} 2 \\ 3 \overline{) 6x^3 - 16x^2 + 11x - 5} \\ \underline{6x^3 - 12x^2} \phantom{+ 11x - 5} \\ 4x^2 + 11x - 5 \\ \underline{4x^2 - 8x} \phantom{- 5} \\ 19x - 5 \\ \underline{18x - 12} \\ x + 7 \end{array}$$

- A.  $6x^2 - 12x + 3 - \frac{9}{3x-2}$       B.  $2x^2 - 4x + 1 - \frac{3}{3x-2}$   
 C.  $2x^2 - 4x + 1 - \frac{1}{3x-2}$       D.  $x^2 + 8x - 3 - \frac{9}{3x-2}$

$$2x^2 - 4x + 1$$

37. B

38. Which represents the correct synthetic division of  $(3x^3 - 2x + 5) \div (x - 2)$ .

A. 
$$\begin{array}{r} 2 \overline{) 3 \ -2 \ 5} \\ \underline{\phantom{3} 6 \ 8} \\ 3 \ 4 \ 13 \end{array}$$

B. 
$$\begin{array}{r} -2 \overline{) 3 \ -2 \ 5} \\ \underline{\phantom{3} -6 \ 16} \\ 3 \ -8 \ 21 \end{array}$$

C. 
$$\begin{array}{r} 2 \overline{) 3 \ 0 \ -2 \ 5} \\ \underline{\phantom{3} 6 \ 12 \ 20} \\ 3 \ 6 \ 10 \ 25 \end{array}$$

C. 
$$\begin{array}{r} 2 \overline{) 3 \ 0 \ -2 \ 5} \\ \underline{\phantom{3} 6 \ 12 \ 20} \\ 3 \ 6 \ 10 \ 25 \end{array}$$

D. 
$$\begin{array}{r} -2 \overline{) 3 \ 0 \ -2 \ 5} \\ \underline{\phantom{3} -6 \ 12 \ -20} \\ 3 \ -6 \ 10 \ -15 \end{array}$$

38. C

39. Factor  $27x^3 - 1$  completely.

$$(3x-1)(9x^2+3x+1)$$

- A.  $(3x - 1)(9x^2 + 3x + 1)$       B.  $(3x - 1)(9x^2 - 3x - 1)$   
 C.  $(3x - 1)^3$       D.  $(3x - 1)(9x^2 - 3x + 1)$

39. A

40. Write an equation for the line that passes through (0,5) and is parallel to the line whose equation is  $4x - y = 3$ .

$$m = \frac{-A}{B} = \frac{-4}{-1} = 4$$

$$y = 4x + 5$$

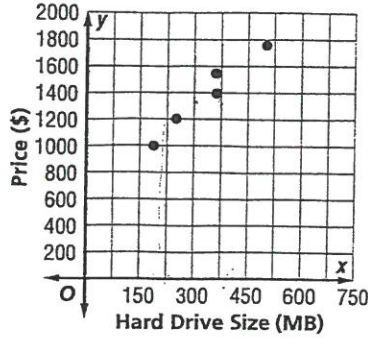
- A.  $y = -\frac{1}{4}x + 5$       B.  $y = 4x - 3$   
 C.  $y = \frac{1}{4}x + 5$       D.  $y = 4x + 5$

40. D

\* graph all 4 y =

\* goto table to check points w/ points in graph

41. Which equation could be a prediction equation for the data points shown in the scatter plot at the right?



- A.  $y = \frac{7}{4}x + 400$       B.  $y = \frac{11}{5}x + 650$   
 C.  $y = 5x + 600$       D.  $y = \frac{3}{2}x + 800$

41. B

42. Evaluate  $f\left(\frac{3}{4}\right)$  if  $f(x) = [1 - 2x]$

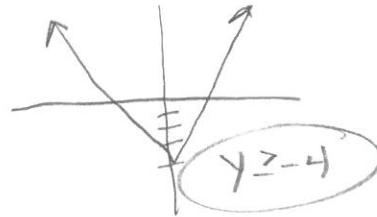
$$\left[1 - 2\left(\frac{3}{4}\right)\right] = \left[1 - \frac{6}{4}\right] = \left[-\frac{1}{2}\right]$$

greatest int.  $\leq -\frac{1}{2}$   
 $= -1$

- A. 0      B. -2      C. -1      D. 1

42. C

43. Identify the range of  $y = |x| - 4$ .



- A.  $\{x \geq 4\}$       B.  $\{y \geq -4\}$   
 C.  $\{y \geq 0\}$       D. all real numbers

43. B

44. The graph of the linear inequality  $y \leq -\frac{2}{3}x + 2$  is the region \_\_\_\_\_ the graph of  $y = -\frac{2}{3}x + 2$

less than or equal to

- A. above      B. below      C. on or above      D. on or below

44. D

45. Which point satisfies the inequality  $y \leq |-x + 3|$ ?

$$4 \leq | -(-2) + 3 | \quad ; \quad 4 \leq 5 \quad T$$

- A. (3, 6)      B. (-2, 4)      C. (5, 7)      D. (1, 4)

45. B

46. Find the range of the relation  $\{(-2, 3), (-1, 3), (-1, 5)\}$ . Then determine whether the relation is a function.

↳ y values

- A.  $\{-2, -1\}$ ; function      B.  $\{-2, -1\}$ ; not a function  
 C.  $\{3, 5\}$ ; function      D.  $\{3, 5\}$ ; not a function

46. D

47. Find  $f(-1)$  if  $f(x) = \frac{x^2 - 4}{x + 2}$ .

$$\frac{(-1)^2 - 4}{(-1) + 2} = \frac{-3}{1} = -3$$

- A. -5      B. -3      C. 1      D. 3

47. B

Not a function bc x-coord repeat.

$$f(a) = a^2 - 2a - 2$$

48. Find  $f(a)$  if  $f(t) = t^2 - 2t - 2$ .

- A.  $(t + a)^2 - 2t + a - 2$       B.  $(t + a)^2 - 2(t + a) - 2$   
 C.  $a^2 - 2t - 2$       D.  $a^2 - 2a - 2$

48. D

49. Which equation is linear?

- A.  $y > x - 2$       B.  $y = x^2$       C.  $y = 3$       D.  $y^2 = \frac{1}{2}x + 1$

49. C

50. Write  $3y = -1 - 5x$  in standard form.

$$5x + 3y = -1$$

- A.  $5x + 3y = -1$       B.  $-5x - 3y = -1$   
 C.  $y = -\frac{5}{3}x - 1$       D.  $3x + 5y - 1 = 0$

50. A

51. Find the x-intercept and y-intercept of the graph of  $3x - 2y = 12$ .

- A.  $(4, -6)$       B.  $4; -6$       C.  $(2, -3)$       D.  $-6; 4$

X-int  
 $3x - 2(0) = 12$   
 $3x = 12$   
 $x = 4$

Y-int  
 $3(0) - 2y = 12$   
 $-2y = 12$   
 $y = -6$

51. B

52. Find the slope of the line that passes through  $(2, 6)$  and  $(-7, 8)$ .

- A.  $-\frac{5}{2}$       B.  $-\frac{2}{5}$       C.  $-\frac{2}{9}$       D.  $-\frac{9}{2}$

$$\frac{8-6}{-7-2} = \frac{2}{-9}$$

52. C

53. What is the slope of the line  $y = -2$ ?

- A.  $-2$       B.  $0$       C.  $\frac{1}{2}$       D. undefined

horizontal lines have 0 slope

53. B

54. What is the slope of a line that is parallel to the graph of  $2x + 3y = 5$ ?

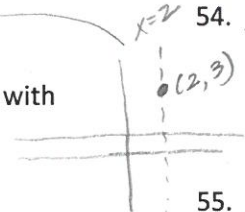
- A.  $\frac{3}{2}$       B.  $-\frac{2}{3}$       C.  $\frac{2}{3}$       D.  $-\frac{3}{2}$

$$m = -\frac{A}{B} = -\frac{2}{3}$$

54. B

55. The graph of the line through  $(2, 3)$  that is perpendicular to the line with equation  $y = -1$  also goes through which point?

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



55. C

56. Write an equation in slope-intercept form for the line that has a slope of  $-4$  and passes through  $(1, 2)$ .

- A.  $y = -2x + 4$       B.  $y = -4x + 6$   
 C.  $y = -4x + 2$       D.  $y = -4x + 9$

$$y = -4x + b$$

$$2 = -4(1) + b$$

$$b = 6$$

56. B

$$y = -4x + 6$$

57. Write an equation in slope-intercept form for the line that passes through (1, -2) and (3, 7).

A.  $y = \frac{9}{2}x - \frac{13}{2}$

B.  $y = \frac{9}{2}x - \frac{57}{2}$

C.  $y = \frac{2}{9}x + \frac{13}{9}$

D.  $y = \frac{2}{9}x - \frac{19}{3}$

57. A

$$m = \frac{7 - (-2)}{3 - 1} = \frac{9}{2} = \frac{9}{2}$$

$$y = \frac{9}{2}x + b$$

$$7 = \frac{9}{2}(3) + b$$

$$7 - \frac{27}{2} = b$$

$$\frac{14}{2} - \frac{27}{2} = b$$

$$\frac{-13}{2} = b$$

$$y = \frac{9}{2}x - \frac{13}{2}$$