

Algebraic Connections

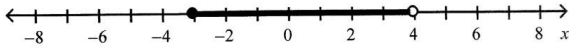
Spring Final Review

Name: Key Date: _____

1. Name the set using roster notation: even natural numbers less than 5

{2, 4}

2. Represent this graph using interval notation.



[-3, 4)

Solve the equation. Then check your solution.

3. $x - 4 = 2$
 $x = 6$
 Check: $6 - 4 = 2$
 $2 = 2$ ✓

4. $9d + 1 = 8d - 15$
 $d = -16$
 Check: $9(-16) + 1 = 8(-16) - 15$
 $-143 = -143$ ✓

Simplify.

5. $(4g^3h^4)^3$
 $64g^9h^{12}$

6. $[80 \div (4 \cdot 5)] \div 2$
 2

7. $5[7 - (0 \times 173)]$
 35

Solve the given inequality. Describe the solution set using the set-builder or interval notation. Then, graph the solution set on a number line.

8. $m + 4 \geq 5$
 $m \geq 1$ $[1, \infty)$ $\{x | x \geq 1\}$

Solve the compound inequality and graph the solution set.

9. $2k + 5 > 1$ and $3k - 9 \leq 6$
 $-2 < k \leq 5$
 $(-2, 5]$

10. Solve: $3x + 7 = 5x - 15$

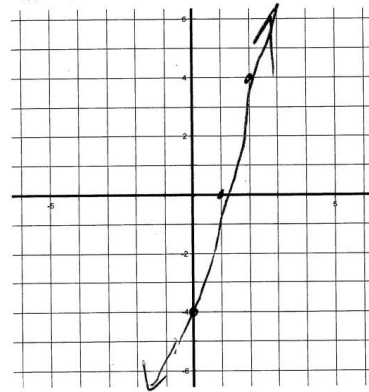
$x = 11$

11. Simplify $\sqrt{50}$

$5\sqrt{2}$

Graph the equation.

12. $y = 4x - 4$



13. $(-2) + 0 = -2$ is an example of which property of real numbers?

Additive Identity

14. $(-2) + 3 = 3 + (-2)$ is an example of which property of real numbers?

Commutative for Addition

15. Order the given numbers from least to greatest:

$\frac{-7}{5}, \sqrt{23}, \frac{-\pi}{4}, 3.14$
 $-\frac{7}{5}, 3.14, -\frac{\pi}{4}, \sqrt{23}$

Evaluate each expression for $r = 12$, $s = -4$, $t = -44$, $a = 2$, $b = -5$, and $c = -3$

16. $t \div s$ 11

17. $(r \div s)^2 \cdot (t \div s)$
99

KEY

18. Write a variable expression for the following:
Nine increased by the product of 3 and y

9 + 3y

19. Calculate the distance between X (1, 6) and Y (-4, 3). Round to the nearest tenth

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

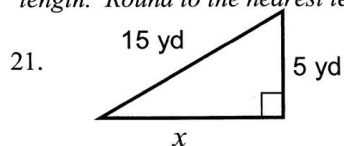
$\sqrt{34} \approx 5.8$

20. Calculate the midpoint of the segment AB with the A (4, -7) and B (-2, 3).

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

(1, -2)

Use the Pythagorean Theorem to find the unknown length. Round to the nearest tenth.



14.1 yd

22. A baseball team won 3 times as many games as it lost. It won 84 games. How many games did it lose?

84 = 3L L = 28 games

23. Write an equation in slope-intercept form ($y = mx + b$) for the line that satisfies the following condition: slope 4, and passes through (2, 20). Start with the point-slope form $[(y - y_1) = m(x - x_1)]$ and go from there.

$y = 4x + 12$

Determine the slope of the line that contains the given

points. $\left(m = \frac{y_2 - y_1}{x_2 - x_1} \right)$

24. T(6,3), V(8,8)

2.5

Determine whether \overline{WX} and \overline{YZ} are parallel, perpendicular, or neither.

25. W(2, 4), X(4, 1), Y(2, 0), Z(-1, -2)

L

Write an equation of the line with the given slope and y-intercept.

26. slope: $\frac{3}{8}$, y-intercept: 3

$y = \frac{3}{8}x + 3$

27. Use addition or subtraction to solve $\begin{cases} x - 2y = 3 \\ 3x + 2y = 1 \end{cases}$

(1, -1)

Write the point-slope form $[y - y_1 = m(x - x_1)]$ of an equation for a line that passes through the point with the given slope.

28. (4, -3), $m = 1$

$y + 3 = 1(x - 4)$

29. Use substitution to solve $\begin{cases} y = 3x - 2 \\ y = -x + 2 \end{cases}$

(1, 1)

30. A bag contains 5 red marbles, 8 blue marbles, and 7 green marbles. Find the probability: P(green or blue)

N/A

31. Two 6-sided dice are rolled. Find the probability that the sum is NOT seven.

N/A

KEY

A standard deck of playing cards consists of 52 cards divided among 4 suits (hearts, diamonds, clubs, and spades). Each suit has 13 cards. Face cards are Jacks, Queens, and Kings. To begin a game, the dealer draws a card at random from a standard deck of playing cards. Find the probability for each of the following compound events:

32. P(a heart or a face card) N/A

33. P(black card and a King) N/A

34. Use the set of data to make a stem-and-leaf plot.

45	51	32	49	44	50	47	36	57	37	41	45
----	----	----	----	----	----	----	----	----	----	----	----

5	710
4	975541
3	762

A die is rolled 200 times with the following results.

Outcome	1	2	3	4	5	6
Frequency	32	36	44	20	30	38

35. What is the **experimental** probability of rolling the given result? a number more than 3

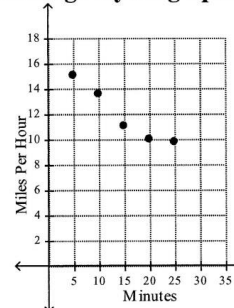
N/A

36. What is the **theoretical** probability of the given event? P(even)

N/A

Determine whether the graph shows a positive correlation, a negative correlation, or no correlation. Describe its meaning in the situation.

37. Average Cycling Speed



NEGATIVE

AS TIME GOES BY THE SPEED

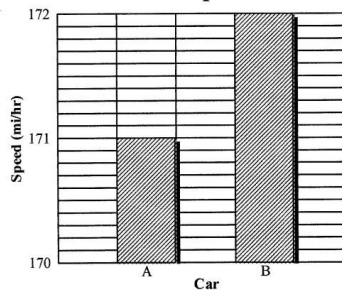
DROPS

38. John is getting his ATM card activated. He must select a password containing 4 nonzero digits to be able to use the card. How many passwords are allowed if no digit may be used more than once?

N/A

39. Car A and Car B were in a race. The driver of Car B claimed that his car was twice as fast as Car A. Do you agree with this claim? Why or why not?

Car Speeds



NO 2(171) ≠ 172

Simplify the given expressions.

40. $(4x^2 + 12x + 12) + (5x^2 - 13x - 4)$

$9x^2 - x + 8$

KEY

41. $-5xy(6xy^3 - 4xy + 7y^2)$

$-30x^2y^4 + 20x^2y^2 - 35xy^3$

42. $(15x^2 + 11xy - 19y^2) - (6x^2 - 3xy)$

$9x^2 + 14xy - 19y^2$

Multiply.

43. $(3x - 4)(2x - 5)$ $6x^2 - 23x + 20$

44. $(2x + 3)^2$ $4x^2 + 12x + 9$

Factor the polynomials.

45. $g^2 - 3g - 54$ $(g - 9)(g + 6)$

46. $x^2 + 15x + 14$ $(x + 1)(x + 14)$

47. $x^2 + 8x - 48$ $(x - 4)(x + 12)$

48. $s^2 - 25t^2$ $(s - 5t)(s + 5t)$

49. Which direction does the following parabola open? $-3x^2 - 7x + 13 = y$ Down

50. What is the vertex of this parabola $2x^2 + 4x - 2 = y$ Use: $\left(x = -\frac{b}{2a}\right)$

$(-1, -4)$

Solve the equation by completing the square.

51. $x^2 - 6x - 27 = 0$

$x^2 - 6x = 27$

$x^2 - 6x + \left(\frac{-6}{2}\right)^2 = 27 + \left(\frac{-6}{2}\right)^2$

$(x - 3)^2 = 36$ $x - 3 = \pm\sqrt{36}$
 $x = -3$ $x = 9$

52. $x^2 - 2x = 0$

$x^2 - 2x + \left(\frac{-2}{2}\right)^2 = 0 + \left(\frac{-2}{2}\right)^2$

$(x - 1)^2 = 1$

$x - 1 = \pm 1$

$x = 0$ $x = 2$

Solve the equation by factoring.

53. $x^2 + 8x - 20 = 0$

$(x - 2)(x + 10) = 0$

$x = 2$ $x = -10$

54. $x^2 - x - 12 = 0$

$(x - 4)(x + 3)$

$x = 4$ $x = -3$

KEY

Find the exact solution of the quadratic equations by using the Quadratic Formula.

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

55. $x^2 - 12x + 35 = 0$

$a = 1$

$b = -12$

$c = 35$

$$\frac{-(-12) \pm \sqrt{(-12)^2 - 4(1)(35)}}{2(1)}$$

$x = 5 \quad x = 7$

56. $2x^2 - 5x + 3 = 0$

$a = 2$

$b = -5$

$c = 3$

$$\frac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(3)}}{2(2)}$$

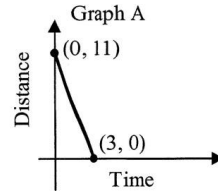
$x = 1 \quad x = \frac{3}{2}$

57. Give the domain and range of the following function. $\{(-3, 4), (3, -4), (0, 2)\}$

Domain: $\{-3, 3, 0\}$

Range: $\{4, -4, 2\}$

58. This graph shows a man's distance from a car over time. Write a story that matches the graph.



HE STANDS 11 m FROM THE CAR THEN MOVES AT A STEADY RATE TO REACH THE CAR IN 3 min.

59. Evaluate the piecewise function for $x = -3$ and $x = 4$.

$$f(x) = \begin{cases} 2-x & \text{if } x < -2 \\ 4x & \text{if } -2 \leq x < 3 \\ 6-x & \text{if } 3 \leq x \end{cases}$$

$f(-3) = 5$

$f(4) = 2$

60. Which graph would represent the following: "A woman climbs a hill at a steady pace and then starts to run down one side."

A

