

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Graph.**

1.  $-4x + y = -10$   
 $6x + 2y = 22$

**Use the substitution method to solve the linear system.**

2.  $-4x + 7y = -2$   
 $-x - y = 5$

**Solve the linear system using elimination.**

3.  $6x + 7y = 5$   
 $4x - 2y = -10$

**Decide how many solutions the equation has.**

4.  $-3x + 3y = 9$   
 $2x - 2y = -6$

5. You have \$160 and save \$7 per week. Your friend has \$210 and saves \$5 per week. After how many weeks will each of you have saved the same amount of money?

**Graph the system of linear inequalities.**

6.  $x + y > 7$   
 $3x + y \leq 6$

**Simplify the expression. The simplified expression should have no negative exponents.**

7.  $(mn)^2 \cdot n^4$

8.  $\left(\frac{a}{2b}\right)^4 \cdot \frac{4}{a^2b}$

9.  $5y^{-4}$

**Write the number in scientific notation.**

10. 30,750,000

11. In 1996, you started your own business. In the first year, your sales totaled \$88,500. Then each year for the next 4 years, your sales increased by 20%. Write an exponential growth model to represent this situation. Then estimate your sales in 2001.

12. A town has a population of 29,000. The population is decreasing by 2.5% each year. At this rate, what will the population be after 10 years?

**Simplify.**

13.  $(2b^3 - b + 6) - (3b^3 - 2b^2 - 7)$

**Find the product.**

14.  $(3z^3 - 5z^2 + 8)(z + 2)$

15.  $(7x + 2)^2$

**Solve the equation by factoring.**

16.  $9x^2 - 13x = -40$

17.  $12x^2 + 17x = 7$

**Factor.**

18.  $4r^2 - 20rs + 25s^2$

19.  $128 - 50x^2$

**Graph.**

20.  $y = -2x^2 + 8x - 5$

**Solve the equation by graphing.**

21.  $128 - 2x^2 = 0$

22. You kick a football into the air. The vertical component of this motion can be modeled by the vertical motion model. Suppose the football has an initial upward velocity of 31 feet per second. The ball makes contact with your foot about 2 feet above the ground. Find the time  $t$  (in seconds) for the football to reach the ground. Use the vertical motion model.

$$-16t^2 + vt + s = h$$

**Solve the equation by finding square roots or using the quadratic formula.**

23.  $64x^2 - 5 = 11$

**Solve the equation by completing the square.**

24.  $x^2 - 2x = 2$

Solve the equation by finding square roots or using the quadratic formula.

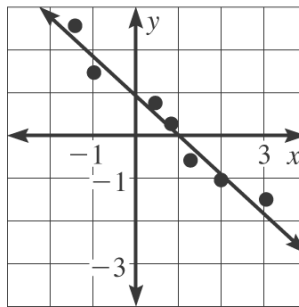
25.  $10x^2 + 17x - 11 = 0$

Decide how many solutions the equation has.

26.  $x^2 - 4x + 4 = 0$

Name the type of model suggested by the graph.

27.



Identify the domain and the range of the function. Then sketch its graph.

28.  $y = 12\sqrt{x}$

Simplify.

29.  $3\sqrt{2} - \sqrt{2}$

30.  $(4 + \sqrt{7})(4 - \sqrt{7})$

Solve.

31.  $\sqrt{2m+3} - 6 = 4$

Determine whether the given lengths can be the sides of a right triangle.

32. 9, 40, 41

For each pair of points, find the distance between the points and the midpoint of the line segment connecting the points.

33. (5, -3), (-4, 7)

Make a table of values for  $x = 1, 2, 3,$  and  $4$ . Use the table to sketch a graph. Decide whether  $x$  and  $y$  vary *directly* or *inversely*.

34.  $y = \frac{15}{2x}$

Graph the function.

35.  $y = 5 - \frac{2}{x}$

36. Divide  $5x^2 + 4x - 7$  by  $x + 2$ .

Simplify.

37.  $\frac{5x^2 - 15x}{15x^4}$

38.  $\frac{6x^2}{8x} \cdot \frac{-4x^3}{2x^2}$

39.  $\frac{x+3}{x^3-x^2-6x} \div \frac{x^2-9}{x^2+x-12}$

40.  $\frac{4}{x+3} + \frac{3x}{x-2}$

**Solve.**

41.  $\frac{9}{x} + \frac{11}{5} = \frac{31}{x}$

42. You invest \$30,000 to start a bagel shop. You can produce bagels for \$1.20 per dozen. How many dozen must you produce before your average cost per dozen (including your initial investment of \$30,000) drops to \$1.80?
43. You do a survey asking students to identify their favorite beverage from the following categories: *soda*, *juice*, *water*, and *other*. You get the following results: 132 students choose soda, 59 choose juice, 43 choose water, and 26 choose other. What is the probability that a randomly chosen student's favorite drink is juice?
44. A card is randomly selected from a standard deck of 52 cards. What is the probability that it is a diamond or a 10?
45. Use the data below. It shows the answers to the survey question, "How many siblings do you have?" Find the mean, median, and mode of the data.  
Responses: 5, 4, 3, 3, 2, 2, 2, 2, 1, 1, 0, 0, 4, 0, 1, 1, 3, 2, 2.

46. Use the table. It shows the height (in inches) of sixth grade students.

Student	Height
Bobby	54 inches
Carl	56 inches
Dean	61 inches
Ebony	49 inches
Francine	52 inches
Gigi	57 inches
Hannah	55 inches
Jeffrey	50 inches
Katrina	56 inches

Use a stem-and-leaf plot to order the heights. Which height is the most common?

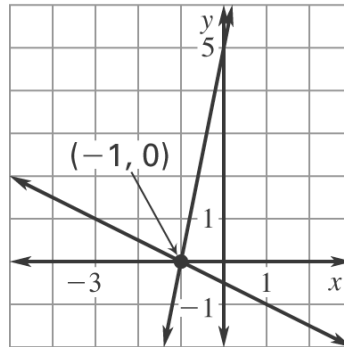
47. Use the data below. It shows John's weekly earnings for a 9-week period.

\$2.15, \$4.00, \$3.35, \$7.00, \$1.75, \$4.50, \$7.00, \$3.50, \$10.00

Make a box-and-whisker plot for the data. Write a summary statement about the data.

**Answer Key**

1. (3, 2)



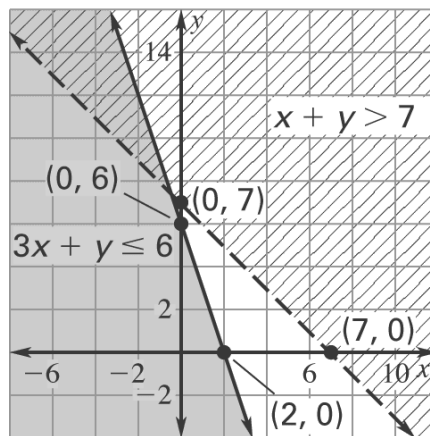
2. (-3, -2)

3.  $(-\frac{3}{2}, 2)$

4. infinitely many solutions

5. 25 weeks

6. Answer:



7.  $m^2n^6$

8.  $\frac{a^2}{4b^5}$

9.  $\frac{5}{y^5}$

10.  $3.075 \times 10^7$

11.  $y = 88,500(1.2)^x$

$$y = 88,500(1.2)^5 \approx \$220,216$$

12. 22,514 people

13.  $-b^3 + 2b^2 - b + 13$

14.  $3z^4 + z^3 - 10z^2 + 8z + 16$

15.  $49x^2 + 28x + 4$

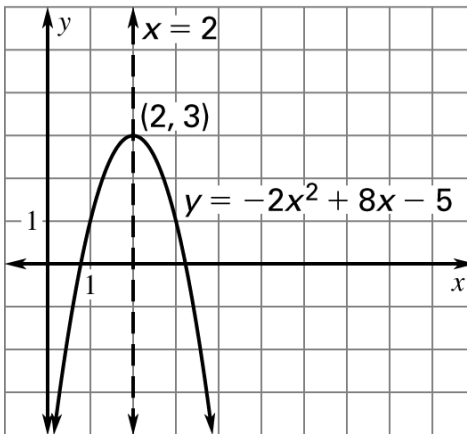
16. 8, 5

17.  $-\frac{7}{4}, \frac{1}{3}$

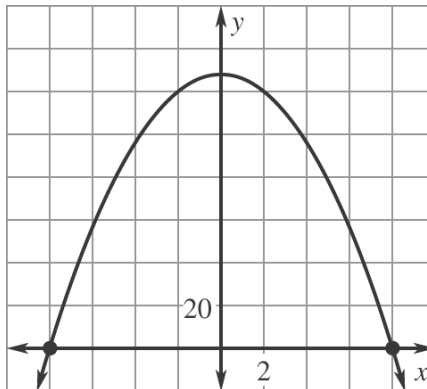
18.  $(2r - 5s)^2$

19.  $2(8 - 5x)(8 + 5x)$

20. Answer:



21.  $x = -8, x = 8$



22. 2 seconds

23.  $\pm \frac{1}{2}$

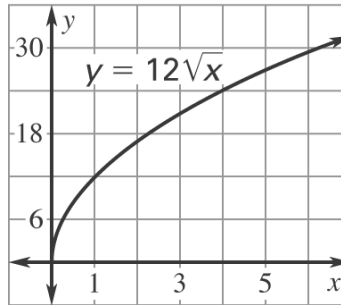
24.  $1 + \sqrt{3}, 1 - \sqrt{3}$

25.  $\frac{1}{2}, -\frac{11}{5}$

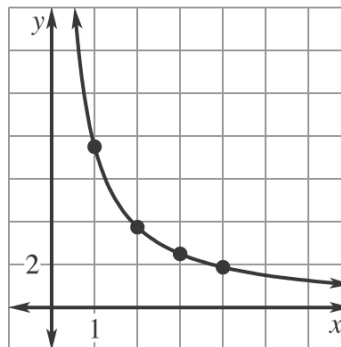
26. One solution

27. linear

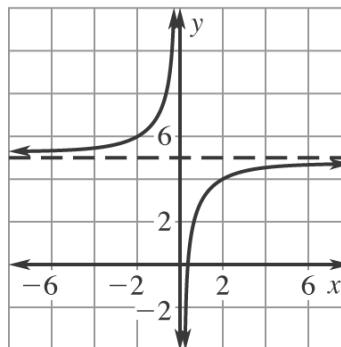
28. Domain: all nonnegative numbers  
Range: all nonnegative numbers



29.  $2\sqrt{2}$   
30. 9  
31.  $m = 48\frac{1}{2}$   
32. yes  
33.  $\sqrt{181}, (0.5, 2)$   
34. Answer:



35. Answer:



36.  $5x - 6 + \frac{5}{x+2}$   
37.  $\frac{x-3}{3x^3}$

38.  $\frac{-3x^2}{2}$

39.  $\frac{x+4}{x(x-3)(x+2)}$

40.  $\frac{3x^2+13x-8}{(x+3)(x-2)}$

41.  $x = 10$

42. 50,000 dozen

43.  $\frac{59}{260} \approx 0.23$

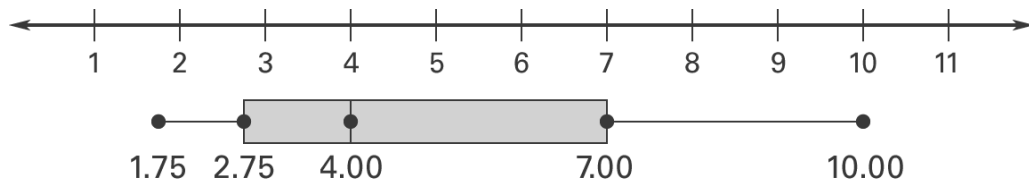
44.  $\frac{4}{13}$

45. mean: 2, median: 2, mode: 2

46.  $4 \mid 9$   
 $5 \mid 0 2 4 5 6 6 7$   
 $6 \mid 1$

56 inches

47. Answer:



## Standards Summary

NCTM 9-12.ALG.2.b	write equivalent forms of equations, inequalities, and systems of equations and solve them with fluency-mentally or with paper and pencil in simple cases and using technology in all cases;
NCTM 9-12.NOP.1.a	develop a deeper understanding of very large and very small numbers and of various representations of them;
IL 9-10.8.D.4	Formulate and solve linear and quadratic equations and linear inequalities algebraically and investigate nonlinear inequalities using graphs, tables, calculators and computers.
NCTM 9-12.ALG.3.c	draw reasonable conclusions about a situation being modeled.
NCTM 9-12.GEO.1.a	analyze properties and determine attributes of two- and three-dimensional objects;
IL 9-10.7.A.4b	Apply formulas in a wide variety of theoretical and practical real-world measurement applications involving perimeter, area, volume, angle, time, temperature, mass, speed, distance, density and monetary values.
NCTM 9-12.GEO.2.a	use Cartesian coordinates and other coordinate systems, such as navigational, polar, or spherical systems, to analyze geometric situations;
NCTM 9-12.ALG.1.b	understand relations and functions and select, convert flexibly among, and use various representations for them;
NCTM 9-12.ALG.1.c	analyze functions of one variable by investigating rates of change, intercepts, zeros, asymptotes, and local and global behavior;
IL 9-10.10.A.4b	Analyze data using mean, median, mode, range, variance and standard deviation of a data set, with and without the use of technology.
NCTM 9-12.DAP.1.e	compute basic statistics and understand the distinction between a statistic and a parameter.
NCTM 9-12.DAP.2.a	for univariate measurement data, be able to display the distribution, describe its shape, and select and calculate summary statistics;
IL 9-10.10.A.4a	Represent and organize data by creating lists, charts, tables, frequency distributions, graphs, scatterplots and box-plots.
NCTM 9-12.DAP.1.d	understand histograms, parallel box plots, and scatterplots and use them to display data;