ALL ODDS

June 14, 2017

Dear Parent or Caregiver:

Your child has just completed his/her sophomore year of high school. Because your child's junior year includes college classes, he/she will be required to complete a summer Algebra I packet to enhance and perfect his/her college readiness skills.

As part of the work, your child will be required to complete all the math problems within the packet. The packet covers math chapters/topics covered in both semesters of Algebra I. If they struggle with some of the math topics, they can email Mr. Saad (saadh@dearbornschools.org), Mr. Riley (rileyb@dearbornschools.org) or Mrs. Saad (ajamiw@dearbornschools.org) for help. Also, students have access to online tutoring thru IXL Math website (www.ixl.com – email Mrs. Saad for username/password) or Khan Academy (www.khanacademy.org).

The due date for all this work is Tuesday, September 5, which is the first day of school. This will be the first grade entered for the marking period and will be worth 70 summative points. Please encourage your child to work throughout the summer and not wait until the end of the summer to begin working.

Thank you for taking the time to help improve your child's math skills. If you have any questions or concerns, please feel free to contact us.

Sincerely,

Wala Ajami-Saad

Brian Riley

Hassan Saad

Name _____ Class _____ Date _____

Chapter Test — Form A

Chapter 2

Solve each equation. Then check your answer.

1. $8f = 32$
2. $b - 13 = -24$
3. $\frac{k}{5} = 11$
4. $w + 7 = 4$
5. $5n - 7 = 28$
6. $-3x + 4 = -20$
7. $7y + 5 - 3y = -31$
8. $-11.4x + 5.4x = 48$
9. $8(t + 7) = 32$
10. $\frac{1}{4}(p + 2) = 12$
11. $\frac{2h - 6}{6} = \frac{2}{3}$
12. $6(w - 5) - 3w = 12$
13. If $4x - 3 = -31$, what is the value of $-2x + 11$?
14. Solve $3x - 6 = -15$. Justify each step.

Solve each formula in terms of the given variable.

15. $x = \frac{y - z}{5}$; y
16. $2b - 7c = 9$; b

Define a variable and write an equation to model each situation. Then solve.

17. The foreign language club began the year with \$15.00 in its account. At the end of the candy sale, the club had \$654.75 in its account. How much money did the club make?
18. An online music club sells compact discs for \$13.95 each plus \$1.95 shipping and handling per order. If Maria's total bill was \$85.65, how many compact discs did Maria purchase?
19. Tickets to the county fair for four adults and five children cost \$33.00. An adult's ticket costs \$1.50 more than a child's ticket. Find the cost of an adult's ticket.

Solve. If the equation is an identity, write *identity*. If it has no solution, write *no solution*.

20. $18x + 6 = 3(6x + 1)$
21. $8w - 18 = 12w + 14$
22. $4(2 - 4y) = 8y + 36$
23. $3(x + 8) + 5x = 2(12 + 4x)$
24. **Open-Ended** Write a word problem that could be solved using the equation $2x + 8 = 12$.

Chapter Test (continued) Form A

Chapter 2

25. A long-distance phone company charges $4.95 per month plus an additional $.10 per minute.

a. Define a variable and write a formula to find the total cost per month for long-distance service.

b. Use this formula to find the long-distance charges for 120 minutes of calls in one month.

Use the following table for Exercises 26–28.

35	40	52	60	74	81	94	35	42	52	60	76	81	59	79
55	61	56	42	89	57	62	88	77	63	79	59	65	41	59

26. Make a stem-and-leaf plot for the data.

27. Find the mean, median, mode, and range of the data.

28. If another data item, 60, were added to the stem-and-leaf plot, would the range, mean, median, and mode be affected? If so, how?

Define a variable and write an equation to model each situation. Then solve.

29. Tickets for the high school musical are $6.00 for adults and $4.00 for students. How many adults bought tickets if 420 student tickets are sold and the total money collected is $3618?

30. The measures of the interior angles of a triangle total 180°. Two angles of a triangle have measures of 50° each. Find the measure of the third angle.

31. Mrs. Ramirez paid a total of $432 for repairs to her car. The cost of the labor was three-fourths of the total charge. Find the charge for labor.

32. Two buses leave Toledo at the same time and travel in opposite directions. One bus averages 55 mi/h and the other bus averages 45 mi/h. After how many hours will the buses be 400 mi apart?

33. Two teams of scientists leave a university at the same time in special vans to search for tornadoes. The first team travels east at 20 mi/h and the second team travels west at 30 mi/h. Their radios have a range of 125 mi. How much time will pass before the scientists lose radio contact?

Name _____ Class _____ Date _____

Chapter Test — Form A

Chapter 3

Is each number a solution of the given inequality?

1. $4y + 3 \leq -7$

a. -3 **b.** -1 **c.** 3

2. $-6x + 2 > 5$

a. -3 **b.** $-4\frac{1}{2}$ **c.** -0.5

Write an inequality to model each situation.

3. The high temperature will be at least 75°F today.

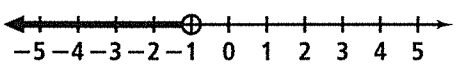
4. The class can contain at most 28 students.

5. The bus can hold no more than 54 people.

6. It will cost more than $25 to rent a car.

Write an inequality for each graph.

7.



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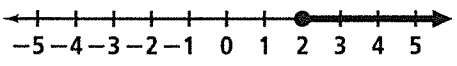

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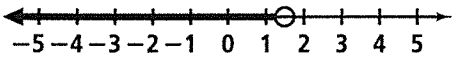

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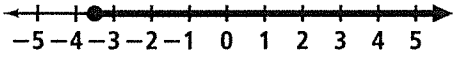


Solve each inequality. Graph the solution.

11. $|r + 3| \geq 7$ **12.** $|6q + 9| \leq 9$ **13.** $-20 \leq 5y$

14. $-9 < 3n < 18$ **15.** $-3 < 5c + 7 < 22$ **16.** $-6b > 42$ or $4b + 6 > 2$

17. $15g < 90$ and $4 + g > 7$ **18.** $4 - x > 3$ **19.** $m + 9 > 6$

20. $6y - 8 \leq 10$ **21.** $f \geq -5f + 36$ **22.** $-\frac{3}{4}a > 6$

23. $-\frac{3}{5}x < 24$ **24.** $3x - 8 < -2x + 22$ **25.** $2|d + 5| - 1 < 3$

Solve each inequality. Check your solution.

26. $3(x - 4) < -15$ **27.** $2(5y + 13) - 5.7 < 20.3$

28. $7x + 2(3x - 11) \leq 17$ **29.** $6(x - 11) - 4x < -72$

30. Writing Explain how to solve $|2d| + 3 < 7$.

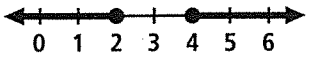
Name _____ Class _____ Date _____

Chapter Test (continued) Form A

Chapter 3

Write a compound inequality that each graph could represent.

31. 

32. 

Solve each equation. Check your solution.

33. $|5x + 13| = -7$

34. $2 = |w - 13|$

35. $|4x + 1| - 3 = 26$

36. $5|8 - y| = 30$

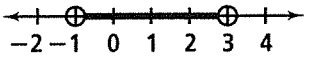
37. Open-Ended Write an absolute value inequality that has 6 and −10 as two of its solutions.

38. Suppose you are working for a trucking company. Your job is to load a truck with at least 5000 lb of freight. You have loaded 2395 lb of freight, but you have to unload 50 lb that was loaded by mistake. Write and solve an inequality to find how many more pounds you need to load.

39. The art club is sponsoring four art shows. They hope the average attendance for the four shows will be between 100 and 120 inclusive. The attendance for the first three shows was 100, 105, and 91. What possible attendance values for the fourth show will allow them to reach their goal? Write and solve an inequality for this situation.

40. A box of cereal should weigh 397 g. The quality control inspector weights every fiftieth box. The inspector rejects any box that is not within 10 g of the ideal weight. Find the range of acceptable weights. Write and solve an absolute value inequality for this situation.

41. Which of the following inequalities could be represented by the graph?



I. $|n - 1| < 2$
II. $4x < 12$ or $-x < 2$
III. $1 < 3h + 4 < 13$

A. I only **B.** I and II **C.** II and III **D.** I and III

Name _____ Class _____ Date _____

Chapter Test — Form A

Chapter 6

Tell whether each statement is true or false. Explain.

1. A rate of change must be negative.
2. The rate of change for a vertical line is zero.

Find the slope of the line passing through each pair of points.

3. $(-3, -1), (-1, 5)$
4. $\left(-\frac{3}{4}, 5\right), \left(\frac{5}{4}, 2\right)$

Graph each equation.

5. $x + 2y = 6$
6. $3x - y = 4$
7. $y = \frac{1}{2}x - 3$
8. $y - 2 = -2(x - 3)$

Write each equation in slope-intercept form.

9. $2x - 3y = 9$
10. $x - 4y = -20$
11. $6x + 9y = 27$
12. $7x = 3y - 12$

Find the *x*- and *y*-intercepts of each line.

13. $6x + 12y = 24$
14. $-5x + 3y = -24$
15. $-8x + 4y = 48$
16. $x - y = 5$

Write an equation in point-slope form for the line with the given slope and passes through the given point.

17. $m = \frac{1}{4}$; $(0, -2)$
18. $m = -2$; $(0, 1)$
19. $m = -\frac{7}{6}$; $(0, 2)$
20. $m = -\frac{8}{3}$; $(3, -3)$

Write an equation in slope-intercept form for the line through the given points.

21. $(2, 3); (1, 5)$
22. $(5, -2); (-16, 4)$
23. $(2, -4); (11, -4)$
24. $(7, 5); \left(-1, \frac{1}{5}\right)$

25. Tell whether each of the following lines is *parallel*, *perpendicular*, or *neither* to $y = -\frac{5}{3}x + \frac{3}{5}$.
    a. $3y = -3x + 5$
    b. $15y = -25x + 9$
    c. $y = \frac{3}{5}x - 2$
    d. $5y + 3x = 15$

Name _____ Class _____ Date _____

Form A

Chapter Test

Chapter 7

Solve each system by graphing. Show your work.

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

2. $3x - 5y = 6$
   $6x + 2y = -24$

Critical Thinking Suppose you try to solve a system of linear equations using substitution and get this result. How many solutions does the system have?

3. $x = -2$

4. $y = 12$

5. $6 = x$

6. $-8 = -8$

7. $7 = y$

8. $5 = 3$

Solve each system using substitution. Show your work.

9. $y = 2x + 11$
   $y = -x + 5$

10. $y = 4x - 3$
    $y = 5x - 1$

Solve each system using elimination. Show your work.

11. $x - 3y = 9$
    $-x + 2y = 1$

12. $4x - 5y = 11$
    $6x + 7y = 31$

13. $-5x - 4y = -11$
    $10x + y = -6$

14. $13x + y = 15$
    $-9x - 3y = -15$

Use a system of equations to model each situation. Solve by any method.

15. An amusement park charges admission plus a fee for each ride. Admission plus two rides costs \$10. Admission plus five rides cost \$16. What is the charge for admission? For each ride?

16. An orchestra consists of string instruments and wind instruments in a ratio of 9 to 4. There are 91 string and wind instruments in the orchestra. How many string instruments are there? How many wind instruments?

17. Suppose you spend \$500.00 on an oven to bake bread. Each loaf of bread costs you \$.20 to bake. You sell the loaves for \$1.00 each. How many loaves of bread must you sell to break even?

18. Which point is not a solution of $y \geq -2x + 5$?
    A. $(5, 2)$ B. $(-1, 8)$ C. $(4, 0)$ D. $(3, -3)$

19. **Writing** The graphs of a system of linear equations form a pair of parallel lines. Explain why the system has no solution.

Chapter Test (continued) Form A

Chapter 7

Solve each system by graphing.

20. $y \geq -3x + 2$
$y < 2x + 2$

21. $y < -x + 4$
$y \leq 5x - 2$

22. $y > 5 - x$
$y < -3x + 3$

23. $y \leq 4x - 6$
$y \leq -2x - 6$

24. **Open-Ended** Write a system of two linear equations with one solution and solve by any method.

25. Tickets for a school play cost either \$2 or \$3, depending on the age of the buyer. The total amount of money brought in was at most \$282.

a. Write a linear inequality that describes the situation.

b. Graph the linear inequality.

c. What is the maximum number of tickets that could have been sold for \$2?

d. What is the maximum number of tickets that could have been sold for \$3?

26. At most 500 ft of fencing is available for a steer pasture. There is only space for the pasture to be at most 100 ft wide.

a. Write a system of two linear inequalities that describes this situation.

b. Graph the system to show all possible solutions.

c. Write two possible solutions to the problem.

27. A quantity of 22% acid solution is being diluted with some 8% acid solution. The final solution must be 12% acid and contain 101 mL. How much of each solution must be added to accomplish this?

a. Write a system of equations that describes the situation.

b. Solve the system.

28. PhotoLab charges \$9.00 for processing a 24-exposure roll of film and \$12.00 for processing a 36-exposure roll. After their class trip, Mr. Renkens' 8th grade class sent 22 rolls of film to be developed and paid \$219 for processing.

a. Write a system of equations that describes the situation.

b. Find the number of rolls of 24-exposure and the number of rolls of 36-exposure film that were processed.

Name _____ Class _____ Date _____

Chapter Test — Form A

Chapter 8

Simplify each expression. Use positive exponents.

1. $a^4b^{-7}c^0$
2. $(0.93^6)(0.93^{-8})$
3. $\frac{p^3q^{-1}}{q^2r^{-6}}$
4. $(m^3n^{-5}m^{-1})^{-3}$
5. $\left(\frac{x^4y^{-2}}{x^{-3}y^5}\right)^{-1}$
6. $u^{-5}v^4(-u^3v^{-2})^3$
7. If $z = \frac{1}{2}$, which expression has the greatest value?

   A. $z^{-6}z^4$ **B.** $(z^{-2}z^5)^{-2}$ **C.** $(z^3)^5$ **D.** $-(z^2z^{-4})^{-3}$

Determine whether each number is in scientific notation. If it is not, write it in scientific notation.

8. 4.8×10^4
9. 119×10^{-3}
10. -7×10^{11}
11. $\frac{4}{5} \times 10^2$

Solve each problem using scientific notation.

12. At the end of 1993, there were 109 nuclear power plants operating in the United States. These plants generated a total of 6,520,000,000,000,000 Btu (British thermal unit) of electric power in 1993. How much energy was generated per plant?
13. A red blood cell is 0.000007 m in diameter. There are about 20,000,000,000,000 red blood cells in a 125-lb person. If all of the red blood cells were lined up end to end, how long would the line be?
14. Use the sequence $80, -20, 5, -\frac{5}{4}, \ldots$.
    - **a.** What is the common ratio?
    - **b.** What are the next three terms?
    - **c.** Write a rule for the sequence.
    - **d.** What is the tenth term of the sequence?
15. Choose the correct eighth term of the sequence $A(n) = \frac{1}{2}(-3)^{n-1}$.

    A. 364.5 **B.** -1093.5 **C.** -121.5 **D.** 3280.5
16. A swing loses 20% of its previous height on each swing. Suppose the swing starts at a height of 10 ft. Choose the answer that represents the height of the swing after its fourth swing.

    A. 6.4 ft **B.** 5.1 ft **C.** 8.0 ft **D.** 4.1 ft

Name _____ Class _____ Date _____

Chapter Test (continued) Form A

Chapter 8

Evaluate each function for $x = -1, 1, 2$.

17. $f(x) = 4 \cdot 7^x$ **18.** $y = \frac{2}{3} \cdot 6^x$ **19.** $f(x) = 13 \cdot (1.3)^x$ **20.** $h(x) = 3 \cdot \left(\frac{4}{5}\right)^x$

Graph each function.

21. $f(x) = \frac{1}{3} \cdot 3^x$ **22.** $y = 3 \cdot \left(\frac{1}{3}\right)^x$ **23.** $y = 1 \cdot 0.5^x$

24. Open-Ended Write and solve a problem comparing interest compounded annually to interest compounded quarterly.

25. Critical Thinking In the exponential decay equation $y = 3(0.25)^x$, is there a value of x that makes y less than zero? Explain.

26. An investment of $2000 doubles every 12 yr.

a. How much is the investment worth after 36 yr? After 60 yr?

b. Model the value of the investment with an exponential function.

27. The decay of 50 g of the radioactive substance cobalt-60 can be modeled by the exponential function $y = 50 \cdot 0.88^x$, where x is in years.

a. Graph the exponential function.

b. Use your graph to estimate the half-life of cobalt-60.

28. Suppose you deposit $1000 earned from your summer job in a savings account that pays 4.8% interest compounded monthly.

a. Write an exponential function to model the amount of money in your savings account.

b. How much will you have in your account after 1 yr? After 2 yr?

29. The function $y = 41 \cdot 0.95^x$ models the difference (in minutes) between men's and women's finishing times for the Boston Marathon. The number of years since women first officially ran the race in 1972 is represented by x.

a. Does the exponential function represent growth or decay?

b. Estimate the difference between finishing times in 1990.

c. Predict the difference between finishing times in 2005.

30. For what values of x is the function $y = 3^x$ between 0 and 1? For what values of x is the function less than 0?

Name _____ Class _____ Date _____

Chapter Test — Form A

Chapter 9

Write each polynomial in standard form. Then name each expression based on its degree and number of terms.

1. $2x^3 - x^2 + 4x$
2. $y^2 + 3y + 6 - 4y^2 - 6y$
3. $8 - 6w - 12w - 8w^2 - 7 - 3w^3$
4. $6x^5 + 3x^3 - 7x^5 - 4x^3$

Simplify. Write each answer in standard form.

5. $(x^2 - 3x + 5) + (x^2 + 2x - 3)$
6. $(2x^2 + 6x + 7) + (3x^2 + 3x - 5)$
7. $(3x^2 + 4x - 10) - (2x + 7 - 4x^2)$
8. $(8x - 4x^2 + x^3) - (8x^2 + 4x^3 - 7x)$
9. **Open-Ended** Write a trinomial with degree 5.

Simplify each product. Write in standard form.

10. $8x(3x + 4 - x^2)$
11. $-y(8y^2 + y)$
12. $7x(3 - x + 6x^3)$
13. $5y(y^5 + 8y^3)$
14. $6x(x^2 + 2x + 1)$
15. $(y + 4)(y + 3)$
16. $(a + 3)(a - 1)$
17. $(2y - 8)(y - 4)$
18. $(3x + 4)(5x - 9)$
19. $(x - 1)(x^2 + 6x + 4)$
20. $(2x^2 - 6x - 5)(3 - x)$
21. $(8x - 7)(3x + 2)$

Write the GCF of each polynomial.

22. $12x^3 + 6x^2 - 3x$
23. $18x^2 + 16x - 12x^3$
24. $6y^2 - 12y^3 + 36y^4$
25. $-10y^3 + 8y^2 - 20y$
26. **Writing** A student commented, "Factoring undoes the distributive property." What do you think the student meant? Explain and give an example.

Write an expression for each situation as a product and in standard form.

27. A settling pond at a sewage treatment facility is rectangular. The length of the pond is 15 ft more than 4 times its width w. What is the area of the pond?

Name _____ Class _____ Date _____

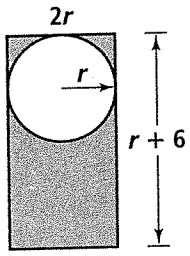
Chapter Test (continued) Form A

Chapter 9

28. The length of an airplane hangar is 20 ft less than 4 times its height h. The width of the hangar is 10 ft more than 2 times its height. What polynomial expression represents the volume of the hangar?

Geometry Write an expression for the area of each shaded region. Write your answer in simplest form.

29.



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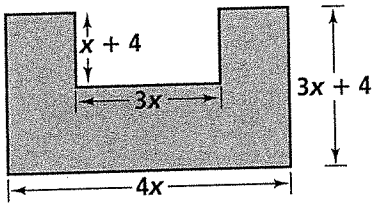


Factor each expression.

31. $x^2 - 6x + 5$

32. $y^2 + 18y + 81$

33. $16x^2 + 48x + 36$

34. $y^2 - 144$

35. $y^2 - 10y + 25$

36. $9x^2 - 64$

37. $64x^2 + 40x + 6$

38. $14x^2 - 56$

Write the value missing from each perfect square trinomial.

39. $x^2 + \_\_\_\_\_x + 64$

40. $\_\_\_\_\_y^2 + 16y + 16$

41. $25x^2 - 60x + \_\_\_\_\_$

42. $36y^2 - \_\_\_\_\_y + 100$

Identify the factor common to the first two terms and the factor common to the last two terms of the polynomial.

43. $9x^5 + 6x^4 - 12x + 8$

44. $20x^4 + 16x^3 - 5x - 4$

Factor completely.

45. $15y^3 + 12y^2 + 5y + 4$

46. $6x^2 - 2x - 20$

47. $x^4 - 6x^3 + 6x - 36$

48. $12x^3 - 18x^2 - 8x + 12$

49. $24y^3 + 56y^2 - 6y - 14$

50. $-4y^3 + 3y^2 + 8y - 6$

51. Open-Ended Writing $(x + y)^2$ as $x^2 + y^2$ illustrates a common error. Explain.

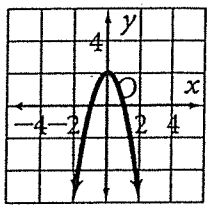
Name _____ Class _____ Date _____

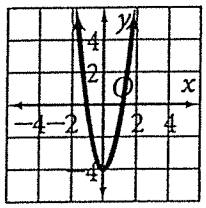
Chapter Test — Form A

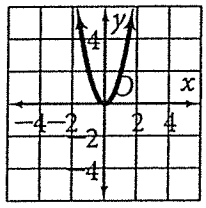
Chapter 10

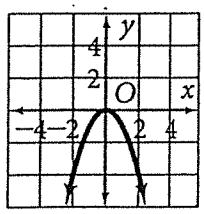
Match each graph with its function.

1. $y = -2x^2 + 2$ 2. $y = -x^2$ 3. $y = 2x^2$ 4. $y = 3x^2 - 4$

A. 

B. 

C. 

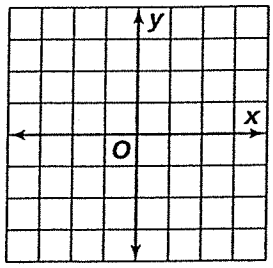
D. 

Find the equation of the axis of symmetry and the coordinates of the vertex of the graph of each function. Is the vertex a maximum or a minimum?

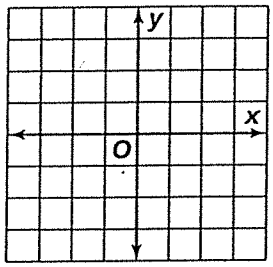
5. $y = -4x^2 + 3$ 6. $y = x^2 + 5x - 12$ 7. $y = \frac{3}{2}x^2 - 6x + 5$ 8. $y = \frac{1}{4}x^2 + 8x$

Graph each function.

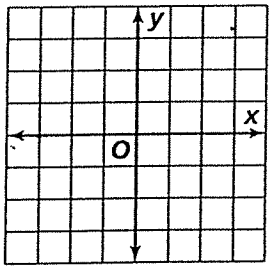
9. $y = \frac{2}{3}x^2$



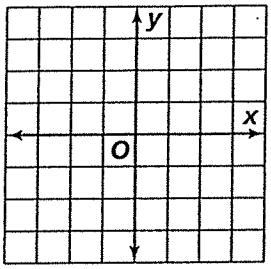
10. $y = -x^2 + 3$



11. $y = 2x^2 + 5x - 7$



12. $y = x^2 - 5$



13. **Open-Ended** Write an equation of a parabola that has two x-intercepts and a minimum vertex. Include a graph of the parabola.

Find the number of x-intercepts of each function.

14. $y = 8x^2$ 15. $y = 4x^2 + 9$ 16. $y = -3x^2 + x - 4$ 17. $y = x^2 - 5x$

Find the principal and the negative square root of each number. If necessary, round to the nearest hundredth.

18. 900 19. 1.21 20. $\frac{16}{25}$ 21. 0.64

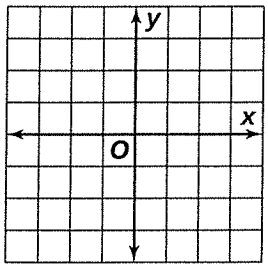
Name _____ Class _____ Date _____

Chapter Test (continued) Form A

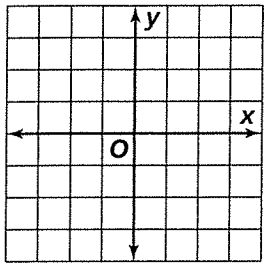
Chapter 10

Graph each inequality.

22. $y > x^2 + 2$



23. $y \leq -x^2 + 3$



Between what two consecutive integers is each square root?

24. $\sqrt{18}$ **25.** $\sqrt{156}$ **26.** $\sqrt{432}$ **27.** $-\sqrt{7.99}$

Find the number of solutions of each equation.

28. $x^2 + 3x = 4$ **29.** $-2x^2 - 5x = 0$ **30.** $4x^2 - 3x = -2$ **31.** $x^2 + 12 = 0$

Solve each equation. If necessary, round to the nearest hundredth.

32. $3x^2 = 48$ **33.** $2x^2 - 5x = 12$ **34.** $-x^2 + 6x - 4 = 0$

35. $6x^2 - 8x - 30 = 0$ **36.** $x^2 - 81 = 0$ **37.** $2x^2 + 5x - 63 = 0$

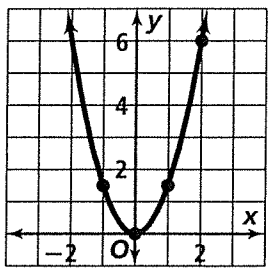
Model each problem with a quadratic equation. Then solve.

38. The volume of a square pyramid is given by the formula $V = \frac{1}{3}hx^2$, where h is the height of the pyramid and x is the length of one side of the base. A pyramid with a height of 15 ft has a volume of 2880 ft^3. What is the length of one side of the base?

39. The area of a soccer field is 5000 yd^2. The length of the field is twice the width. Find the dimensions of the field.

Identify each graph as linear, quadratic, or exponential. Write an equation that models the data shown in each graph.

40.



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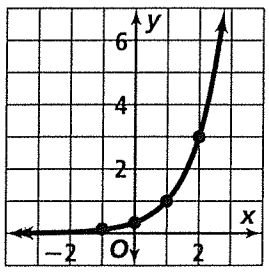

42.