

Determine whether the graph of each function is symmetric with respect to the origin.

6. $f(x) = x^6 + 9x$

7. $f(x) = \frac{1}{5x} - x^{19}$

14. $f(x) = 3x$

15. $f(x) = x^3 - 1$

16. $f(x) = 5x^2 + 6x + 9$

17. $f(x) = \frac{1}{4x^7}$

18. $f(x) = -7x^5 + 8x$

19. $f(x) = \frac{1}{x} - x^{100}$

20. Is the graph of $g(x) = \frac{x^2 - 1}{x}$ symmetric with respect to the origin? Explain how you determined your answer.

42. Critical Thinking Must the graph of an odd function contain the origin? Explain your reasoning and illustrate your point with the graph of a specific function.

7. Which of the following must be true?

- I. The sum of two consecutive integers is odd.
- II. The sum of three consecutive integers is even.
- III. The sum of three consecutive integers is a multiple of 3.

- A I only
- B II only
- C I and II only
- D I and III only
- E I, II, and III

8. Jose has at least one quarter, one dime, one nickel, and one penny in his pocket. If he has twice as many pennies as nickels, twice as many nickels as dimes, and twice as many dimes as quarters, then what is the least amount of money he could have in his pocket?

- A \$0.41
- B \$0.64
- C \$0.71
- D \$0.73
- E \$2.51

9. Simplify $\frac{\frac{3}{2}}{\left(\frac{3}{2}\right)^2}$.

- A $\frac{27}{8}$
- B $\frac{3}{2}$
- C $\frac{2}{3}$
- D $\frac{1}{2}$
- E $\frac{1}{3}$

10. **Grid-In** At a music store, the price of a CD is three times the price of a cassette tape. If 40 CDs were sold for a total of \$480 and the combined sales of CDs and cassette tapes totaled \$600, how many cassette tapes were sold?

Determine whether the graph of each equation is symmetric with respect to the x-axis, y-axis, the line $y = x$, the line $y = -x$, or none of these.

21. $xy = -5$

22. $x + y^2 = 1$

23. $y = -8x$

24. $y = \frac{1}{x^2}$

39. Critical Thinking Write the equation of a graph that is symmetric with respect to the x-axis.

48. Write an equation in slope-intercept form for the line that passes through $A(0, 2)$ and $B(-2, 16)$. (Lesson 1-4)

49. If $f(x) = -2x + 11$ and $g(x) = x - 6$, find $[f \circ g](x)$ and $[g \circ f](x)$. (Lesson 1-2)

SAT/ACT Practice What is the product of 75^3 and 75^7 ?

A 75^5

B 75^{10}

C 150^{10}

D 5625^{10}

E 75^{21}

After you work each problem, record your answer on the answer sheet provided or on a piece of paper.

Multiple Choice

1. If the product of $(1 + 2)$, $(2 + 3)$, and $(3 + 4)$ is equal to one half the sum of 20 and x , then $x =$
A 10 B 85 C 105 D 190 E 1,210
2. $5\frac{1}{3} - 6\frac{1}{4} = ?$
A $-\frac{11}{12}$
B $-\frac{1}{2}$
C $-\frac{2}{7}$
D $\frac{1}{2}$
E $\frac{9}{12}$
3. Mia has a pitcher containing x ounces of root beer. If she pours y ounces of root beer into each of z glasses, how much root beer will remain in the pitcher?
A $\frac{x}{y} + z$
B $xy - z$
C $\frac{x}{yz}$
D $x - yz$
E $\frac{x}{y} - z$
4. Which of the following is equal to 0.064?
A $\left(\frac{1}{80}\right)^2$ B $\left(\frac{8}{100}\right)^2$ C $\left(\frac{1}{8}\right)^2$
D $\left(\frac{2}{5}\right)^3$ E $\left(\frac{8}{10}\right)^3$
5. A plumber charges \$75 for the first thirty minutes of each house call plus \$2 for each additional minute that she works. The plumber charged Mr. Adams \$113 for her time. For what amount of time, in minutes, did the plumber work?
A 38 B 44 C 49 D 59 E 64
6. If $\frac{2+x}{5+x} = \frac{2}{5} + \frac{2}{5}$, then $x =$
A $\frac{2}{5}$ B 1 C 2 D 5 E 10

Determine the symmetry

25. $x^2 + y^2 = 4$

26. $y^2 = \frac{4x^2}{9} - 4$

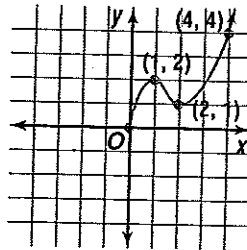
27. Which line(s) are lines of symmetry for the graph of $x^2 = \frac{1}{y^2}$?

For Exercises 28-30, refer to the graph.

28. Complete the graph so that it is the graph of an odd function.

29. Complete the graph so that it is the graph of an even function.

30. Complete the graph so that it is the graph of a function that is neither even nor odd.



38. **Physics** The path of a comet around the Sun can be modeled by a transformation of the equation

$$\frac{x^2}{8} + \frac{y^2}{10} = 1.$$

a. Determine the symmetry in the graph of the comet's path.

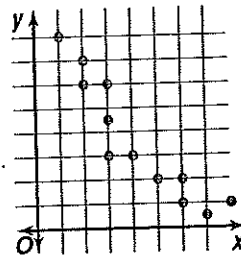
b. Use symmetry to graph the equation $\frac{x^2}{8} + \frac{y^2}{10} = 1$.

c. If it is known that the comet passes through the point at $(2, \sqrt{5})$, name the coordinates of three other points through which it must pass.

41. **Communication** Radio waves emitted from two different radio towers interfere with each other's signal. The path of interference can be modeled by the equation $\frac{y^2}{12} - \frac{x^2}{16} = 1$, where the origin is the midpoint of the line segment between the two towers and the positive y -axis represents north. Juana lives on an east-west road 6 miles north of the x -axis and cannot receive the radio station at her house. At what coordinates might Juana live relative to the midpoint between the two towers?

43. **Manufacturing** A manufacturer makes a profit of \$6 on a bicycle and \$4 on a tricycle. Department A requires 3 hours to manufacture the parts for a bicycle and 4 hours to manufacture parts for a tricycle. Department B takes 5 hours to assemble a bicycle and 2 hours to assemble a tricycle. How many bicycles and tricycles should be produced to maximize the profit if the total time available in department A is 450 hours and in department B is 400 hours? (*Lesson 2-7*)

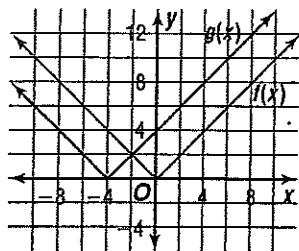
49. Describe the linear relationship implied in the scatter plot at the right. (*Lesson 1-6*)



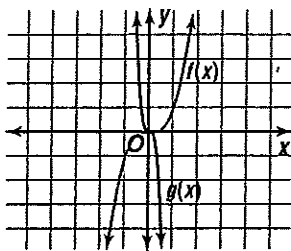
51. **Fund-Raising** The Band Boosters at Palermo High School are having their annual doughnut sale to raise money for new equipment. The equation $5d - 2p = 500$ represents the amount of profit p in dollars the band will make selling d boxes of doughnuts. What is the p -intercept of the line represented by this equation? (*Lesson 1-3*)

Describe how the graphs of $f(x)$ and $g(x)$ are related.

6. $f(x) = |x|$ and $g(x) = |x + 4|$



7. $f(x) = x^3$ and $g(x) = -(3x)^3$



Use the graph of the given parent function to describe the graph of each related function.

8. $f(x) = x^2$

a. $y = (0.2x)^2$

b. $y = (x - 5)^2 - 2$

c. $y = 3x^2 + 6$

9. $f(x) = x^3$

a. $y = |x^3 + 3|$

b. $y = -(2x)^3$

c. $y = 0.75(x + 1)^3$

Describe how the graphs of $f(x)$ and $g(x)$ are related.

13. $f(x) = x$ and $g(x) = x + 6$

15. $f(x) = |x|$ and $g(x) = |5x|$

17. $f(x) = \frac{1}{x}$ and $g(x) = \frac{3}{x}$

14. $f(x) = x^2$ and $g(x) = \frac{3}{4}x^2$

16. $f(x) = x^3$ and $g(x) = (x - 5)^3$

Use the graph of the given parent function to describe the graph of each related function.

20. $f(x) = x^2$

a. $y = -(1.5x)^2$

b. $y = 4(x - 3)^2$

c. $y = \frac{1}{2}x^2 - 5$

21. $f(x) = |x|$

a. $y = |0.2x|$

b. $y = 7|x| - 0.4$

c. $y = -9|x + 1|$

22. $f(x) = x^3$

a. $y = (x + 2)^3 - 5$

b. $y = -(0.8x)^3$

c. $y = \left(\frac{5}{3}x\right)^3 + 2$

12. **Consumer Costs** The cost of labor for servicing cars at B & B Automotive is \$50 for each whole hour or for any fraction of an hour.

- Graph the function that describes the cost for x hours of labor.
- Graph the function that would show a \$25 additional charge if you decide to also get the oil changed and fluids checked.
- What would be the cost of servicing a car that required 3.45 hours of labor if the owner requested that the oil be changed and the fluids be checked?

48. Solve the system of equations algebraically. (Lesson 2-1)

$$6x + 5y = -14$$

$$5x + 2y = -3$$

50. Find the slope of a line perpendicular to a line whose equation is $3x - 4y = 0$. (Lesson 1-5)

52. Find $[f \circ g](x)$ and $[g \circ f](x)$ if $f(x) = \frac{2}{3}x - 2$ and $g(x) = x^2 - 6x + 9$. (Lesson 1-2)

53. **SAT/ACT Practice** If $d = m - \frac{50}{m}$ and m is a positive number that increases in value, then d

A increases in value.

C remains unchanged.

E decreases, then increases.

B increases, then decreases.

D decreases in value.

Determine whether the ordered pair is a solution for the given inequality. Write *yes* or *no*.

13. $y < x^3 - 4x^2 + 2$, (1, 0)

14. $y < |x - 2| + 7$, (3, 8)

15. $y > -\sqrt{x + 11} + 1$, (-2, -1)

16. $y < -0.2x^2 + 9x - 7$, (10, 63)

Graph each inequality.

20. $y \leq x^2 - 4$

23. $y > |2x| + 3$

26. $y > -(0.4x)^2$

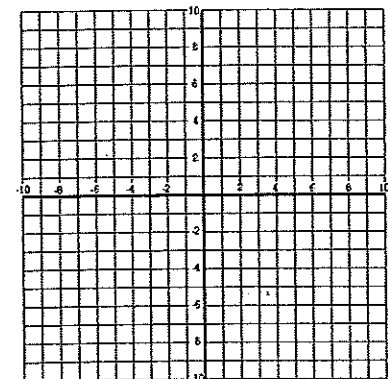
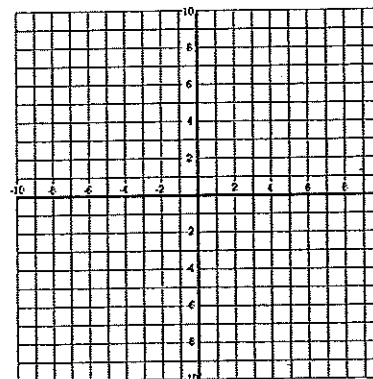
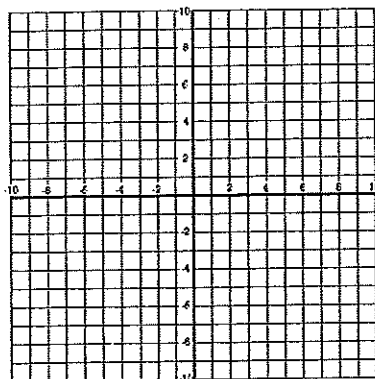
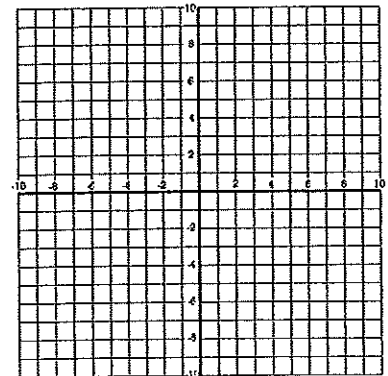
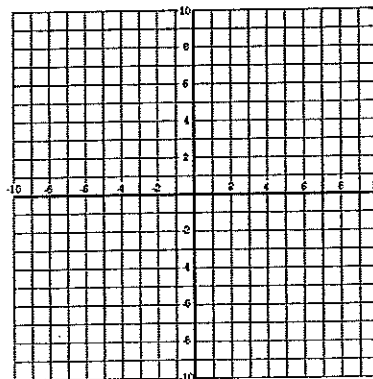
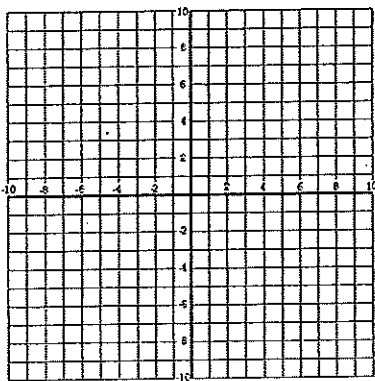
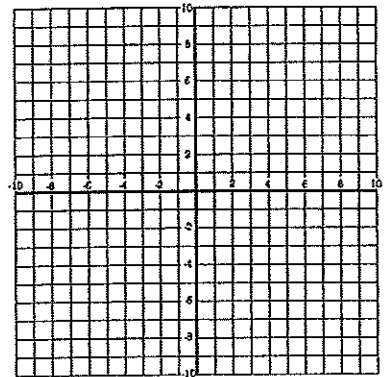
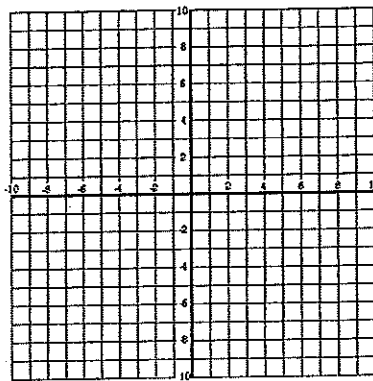
29. $y \geq (x - 1)^2 - 3$

21. $y > \sqrt{0.5x}$

24. $y < (x - 5)^2$

27. $y \leq |3(x - 4)|$

30. $y \geq (2x + 1)^3 + 2$



Solve each inequality.

33. $|x + 4| > 5$

34. $|3x + 12| \geq 42$

35. $|7 - 2x| - 8 < 3$

36. $|5 - x| \leq x$

After you work each problem, record your answer on the answer sheet provided or on a piece of paper.

Multiple Choice

1. For all $y \neq 3$, $\frac{y^2 - 9}{3y - 9} = ?$

A y

B $\frac{y+1}{8}$

C $y + 1$

D $\frac{y}{3}$

E $\frac{y+3}{3}$

2. If $x + y = z$ and $x = y$, then all of the following are true EXCEPT

A $2x + 2y = 2z$

B $x - y = 0$

C $x - z = y - z$

D $x = \frac{z}{2}$

E $z - y = 2x$

53. **SAT Practice Grid-In** Student A is 15 years old. Student B is one-third older. How many years ago was student B twice as old as student A?

3. The Kims drove 450 miles in each direction to Grandmother's house and back again. If their car gets 25 miles per gallon and their cost for gasoline was \$1.25 per gallon for the trip to Grandmother's house, but \$1.50 per gallon for the return trip, how much *more* money did they spend for gasoline returning from Grandmother's house than they spent going to Grandmother's?

A \$2.25

B \$4.50

C \$6.25

D \$9.00

E \$27.00

4. If $x + 2y = 8$ and $\frac{x}{2} - y = 10$, then $x = ?$

A -7

B 0

C 10

D 14

E 28

5. $\frac{900}{10} + \frac{90}{100} + \frac{9}{1000} =$

A 90.09

B 90.099

C 90.909

D 99.09

E 999

Determine whether the graph of each function is symmetric with respect to the origin.

$$6. f(x) = x^6 + 9x$$

$$f(-x) = (-x)^6 + 9(-x)$$

$$= x^6 - 9x$$

$$-f(x) = -(x^6 + 9x)$$

$$= -x^6 - 9x$$

$$\text{NO. } f(-x) \neq -f(x)$$

$$7. f(x) = \frac{1}{5x} - x^{19}$$

$$f(-x) = \frac{1}{5(-x)} - (-x)^{19}$$

$$= -\frac{1}{5x} - x^{19}$$

$$-f(x) = -\left[\frac{1}{5x} - x^{19}\right]$$

$$= -\frac{1}{5x} + x^{19}$$

$$\text{YES. } f(-x) = -f(x)$$

$$14. f(x) = 3x$$

$$f(-x) = 3(-x)$$

$$= -3x$$

$$-f(x) = -(3x)$$

$$= -3x$$

$$\text{YES. } f(-x) = -f(x)$$

$$15. f(x) = x^3 - 1$$

$$f(-x) = (-x)^3 - 1$$

$$= -x^3 - 1$$

$$-f(x) = -(x^3 - 1)$$

$$= -x^3 + 1$$

$$\text{NO. } f(-x) \neq -f(x)$$

$$16. f(x) = 5x^2 + 6x + 9$$

$$f(-x) = 5(-x)^2 + 6(-x) + 9$$

$$= 5x^2 - 6x + 9$$

$$-f(x) = -(5x^2 + 6x + 9)$$

$$= -5x^2 - 6x - 9$$

$$\text{NO. } f(-x) \neq -f(x)$$

$$17. f(x) = \frac{1}{4x^7}$$

$$f(-x) = \frac{1}{4(-x)^7}$$

$$= -\frac{1}{4x^7}$$

$$-f(x) = -\left[\frac{1}{4x^7}\right]$$

$$= -\frac{1}{4x^7}$$

$$\text{YES. } f(-x) = -f(x)$$

$$18. f(x) = -7x^5 + 8x$$

$$f(-x) = -7(-x)^5 + 8(-x)$$

$$= 7x^5 - 8x$$

$$-f(x) = -[-7x^5 + 8x]$$

$$= 7x^5 - 8x$$

$$\text{YES. } f(-x) = -f(x)$$

$$19. f(x) = \frac{1}{x} - x^{100}$$

$$f(-x) = \frac{1}{(-x)} - (-x)^{100}$$

$$= -\frac{1}{x} - x^{100}$$

$$-f(x) = -\left[\frac{1}{x} - x^{100}\right]$$

$$= -\frac{1}{x} + x^{100}$$

$$\text{NO. } f(-x) \neq -f(x)$$

20. Is the graph of $g(x) = \frac{x^2 - 1}{x}$ symmetric with respect to the origin? Explain how you determined your answer.

$$g(-x) = \frac{(-x)^2 - 1}{(-x)}$$

$$= \frac{x^2 - 1}{-x}$$

$$= -\frac{x^2 - 1}{x}$$

$$-g(x) = -\left[\frac{x^2 - 1}{x}\right]$$

$$= -\frac{x^2 - 1}{x}$$

$$g(-x) = -g(x) \quad \therefore \text{it is symmetric w/ respect to the origin.}$$

→ 42. **Critical Thinking** Must the graph of an odd function contain the origin? Explain your reasoning and illustrate your point with the graph of a specific function.

7. Which of the following must be true?

- I. The sum of two consecutive integers is odd.
 - II. The sum of three consecutive integers is even. $2+3+4=9$
 - III. The sum of three consecutive integers is a multiple of 3.
- A I only
 B II only
 C I and II only
 D I and III only
 E I, II, and III

8. Jose has at least one quarter, one dime, one nickel, and one penny in his pocket. If he has twice as many pennies as nickels, twice as many nickels as dimes, and twice as many dimes as quarters, then what is the least amount of money he could have in his pocket?

$$\begin{aligned} 2p &= n \\ 2n &= d \\ 2d &= q \end{aligned}$$

$q=1$.25
$d=2$.20
$n=4$.20
$p=8$.08
	.73

- A \$0.41 B \$0.64 C \$0.71
 D \$0.73 E \$2.51

9. Simplify $\frac{\frac{3}{2}}{\left(\frac{3}{2}\right)^2} \cdot \frac{\frac{3}{2}}{\frac{9}{4}} = \frac{\frac{3}{2} \cdot \frac{4}{9}}{\frac{9}{4}} = \frac{2}{3}$

- A $\frac{27}{8}$
 B $\frac{3}{2}$
 C $\frac{2}{3}$
 D $\frac{1}{2}$
 E $\frac{1}{3}$

10. **Grid-In** At a music store, the price of a CD is three times the price of a cassette tape. If 40 CDs were sold for a total of \$480 and the combined sales of CDs and cassette tapes totaled \$600, how many cassette tapes were sold?

$$480 \div 40 = \$12/\text{disc}$$

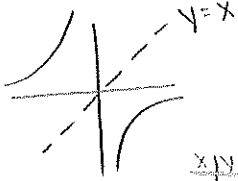
$$\begin{array}{r} 600 \\ - 480 \\ \hline 120 \end{array}$$

$$\begin{aligned} cd &= 3t \\ 12 &= 3t \\ 4 &= t \end{aligned}$$

$120 \div 4 = 30$ tapes were sold

Determine whether the graph of each equation is symmetric with respect to the x-axis, y-axis, the line $y = x$, the line $y = -x$, or none of these.

21. $xy = -5$
 $y = \frac{-5}{x}$



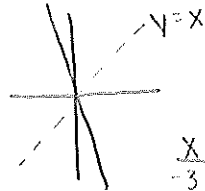
X	Y
3	-1.6
-1	5
0	DNE
1	-5
3	-1.6

22. $x + y^2 = 1$
 $y = \pm\sqrt{1-x}$



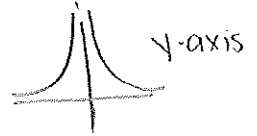
X	Y
-3	2, -2
-1	1.41, -1.41
0	1, -1
1	0
3	DNE

23. $y = -8x$



X	Y
-3	24
-1	8
0	0
1	-8
3	-24

24. $y = \frac{1}{x^2}$



X	Y
-3	.1
-1	1
0	DNE
1	1
3	.1

39. **Critical Thinking** Write the equation of a graph that is symmetric with respect to the x-axis.

$x = y^2$

$y = \pm\sqrt{x}$

48. Write an equation in slope-intercept form for the line that passes through $A(0, 2)$ and $B(-2, 16)$. (Lesson 1-4)

$\frac{16-2}{-2-0} = \frac{14}{-2} = -7$

$2 = -7(0) + b$

$y = -7x + 2$

49. If $f(x) = -2x + 11$ and $g(x) = x - 6$, find $[f \circ g](x)$ and $[g \circ f](x)$. (Lesson 1-2)

$f(g(x)) = -2(x-6) + 11$
 $= -2x + 23$

$g(f(x)) = (-2x+11) - 6$
 $= -2x + 5$

SAT/ACT Practice What is the product of 75^3 and 75^7 ?

A 75^5

(B) 75^{10}

C 150^{10}

D 5625^{10}

E 75^{21}

After you work each problem, record your answer on the answer sheet provided or on a piece of paper.

Multiple Choice

1. If the product of $(1 + 2)$, $(2 + 3)$, and $(3 + 4)$ is equal to one half the sum of 20 and x , then $x =$

$$3 \cdot 5 \cdot 7 = 105 = \frac{1}{2}(20 + x)$$

$$210 = 20 + x$$

$$190 = x$$

- A 10 B 85 C 105 **(D) 190** E 1,210

2. $5\frac{1}{3} - 6\frac{1}{4} = ?$

(A) $-\frac{11}{12}$

B $-\frac{1}{2}$

C $-\frac{2}{7}$

D $\frac{1}{2}$

E $\frac{9}{12}$

3. Mia has a pitcher containing x ounces of root beer. If she pours y ounces of root beer into each of z glasses, how much root beer will remain in the pitcher?



A $\frac{x}{y} + z$

B $xy - z$

C $\frac{x}{yz}$

(D) $x - yz$

E $\frac{x}{y} - z$

4. Which of the following is equal to 0.064?

A $(\frac{1}{80})^2$

B $(\frac{8}{100})^2$

C $(\frac{1}{8})^2$

(D) $(\frac{2}{5})^3$

E $(\frac{8}{10})^3$

5. A plumber charges \$75 for the first thirty minutes of each house call plus \$2 for each additional minute that she works. The plumber charged Mr. Adams \$113 for her time. For what amount of time, in minutes, did the plumber work?

$$75 + 2(x - 30) = 113$$

- A 38 B 44 **(C) 49** D 59 E 64

$$30 + 19 =$$

6. If $\frac{2+x}{5+x} = \frac{2}{5} + \frac{2}{5}$, then $x =$

$$\frac{2+x}{5+x} = \frac{4}{5}$$

A $\frac{2}{5}$

B 1

C 2

D 5

(E) 10

$\frac{4}{9}$

$\frac{3}{6}$

$\frac{4}{10}$

$\frac{7}{10}$

$\frac{12}{15}$

Determine the symmetry

25. $x^2 + y^2 = 4$

$y = \pm \sqrt{x^2 - 4}$

x-axis

y-axis

$y = x$

$y = -x$

26. $y^2 = \frac{4x^2}{9} - 4$

$y = \pm \sqrt{\frac{4}{9}x^2 - 4}$

x, y-axis

27. Which line(s) are lines of symmetry for the graph of $x^2 = \frac{1}{y^2}$?

x-axis

y-axis

$y = x$

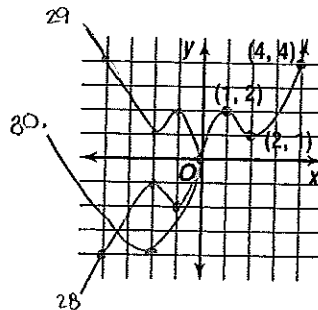
$y = -x$

For Exercises 28-30, refer to the graph.

28. Complete the graph so that it is the graph of an odd function.

29. Complete the graph so that it is the graph of an even function.

30. Complete the graph so that it is the graph of a function that is neither even nor odd.



38. **Physics** The path of a comet around the Sun can be modeled by a transformation of the equation

$\frac{x^2}{8} + \frac{y^2}{10} = 1$. $\frac{y^2}{10} = 1 - \frac{x^2}{8}$ $y^2 = 10(1 - \frac{x^2}{8})$ $y = \sqrt{10 \cdot \frac{10x^2}{8}}$

a. Determine the symmetry in the graph of the comet's path. origin, x-axis, y-axis

b. Use symmetry to graph the equation $\frac{x^2}{8} + \frac{y^2}{10} = 1$.



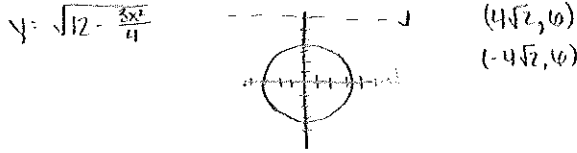
c. If it is known that the comet passes through the point at $(2, \sqrt{5})$, name the coordinates of three other points through which it must pass.

$(2, -\sqrt{5})$

$(-2, \sqrt{5})$

$(-2, -\sqrt{5})$

41. **Communication** Radio waves emitted from two different radio towers interfere with each other's signal. The path of interference can be modeled by the equation $\frac{y^2}{12} - \frac{x^2}{16} = 1$, where the origin is the midpoint of the line segment between the two towers and the positive y -axis represents north. Juana lives on an east-west road 6 miles north of the x -axis and cannot receive the radio station at her house. At what coordinates might Juana live relative to the midpoint between the two towers?



43. **Manufacturing** A manufacturer makes a profit of \$6 on a bicycle and \$4 on a tricycle. Department A requires 3 hours to manufacture the parts for a bicycle and 4 hours to manufacture parts for a tricycle. Department B takes 5 hours to assemble a bicycle and 2 hours to assemble a tricycle. How many bicycles and tricycles should be produced to maximize the profit if the total time available in department A is 450 hours and in department B is 400 hours? (Lesson 2-7)

	A	B	
\$6-B	3h B	5h B	
\$4-T	4h T	2h T	

$$\begin{aligned}
 6B + 4T &= \\
 3B + 4T &= 450 \\
 -2(5B + 2T) &= -800 \\
 -10B - 4T &= -800 \\
 -7B &= -350 \\
 B &= 50
 \end{aligned}$$

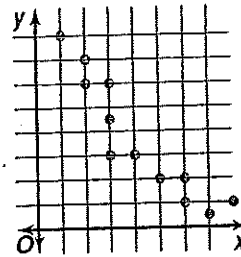
$$\begin{aligned}
 3(50) + 4T &= 450 \\
 150 + 4T &= 450 \\
 4T &= 300 \\
 T &= 75
 \end{aligned}$$

50 bikes
75 tricycles

49. Describe the linear relationship implied in the scatter plot at the right. (Lesson 1-6)

negative

as x increases, y decreases



$$5d - 2p = 500$$

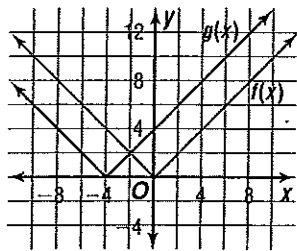
51. **Fund-Raising** The Band Boosters at Palermo High School are having their annual doughnut sale to raise money for new equipment. The equation $5d - 2p = 500$ represents the amount of profit p in dollars the band will make selling d boxes of doughnuts. What is the p -intercept of the line represented by this equation? (Lesson 1-3)

$$(0, 250)$$

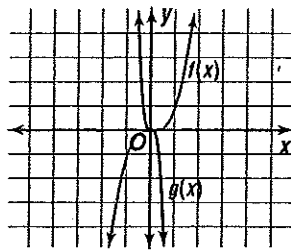
if they don't sell any

Describe how the graphs of $f(x)$ and $g(x)$ are related.

6. $f(x) = |x|$ and $g(x) = |x + 4|$



7. $f(x) = x^3$ and $g(x) = -(3x)^3$



Use the graph of the given parent function to describe the graph of each related function.

8. $f(x) = x^2$

a. $y = (0.2x)^2$

b. $y = (x - 5)^2 - 2$

c. $y = 3x^2 + 6$

9. $f(x) = x^3$

a. $y = |x^3 + 3|$

b. $y = -(2x)^3$

c. $y = 0.75(x + 1)^3$

Describe how the graphs of $f(x)$ and $g(x)$ are related.

13. $f(x) = x$ and $g(x) = x + 6$

15. $f(x) = |x|$ and $g(x) = |5x|$

17. $f(x) = \frac{1}{x}$ and $g(x) = \frac{3}{x}$

14. $f(x) = x^2$ and $g(x) = \frac{3}{4}x^2$

16. $f(x) = x^3$ and $g(x) = (x - 5)^3$

Use the graph of the given parent function to describe the graph of each related function.

20. $f(x) = x^2$

a. $y = -(1.5x)^2$

b. $y = 4(x - 3)^2$

c. $y = \frac{1}{2}x^2 - 5$

21. $f(x) = |x|$

a. $y = |0.2x|$

b. $y = 7|x| - 0.4$

c. $y = -9|x + 1|$

22. $f(x) = x^3$

a. $y = (x + 2)^3 - 5$

b. $y = -(0.8x)^3$

c. $y = \left(\frac{5}{3}x\right)^3 + 2$

12. **Consumer Costs** The cost of labor for servicing cars at B & B Automotive is \$50 for each whole hour or for any fraction of an hour.

- Graph the function that describes the cost for x hours of labor.
- Graph the function that would show a \$25 additional charge if you decide to also get the oil changed and fluids checked.
- What would be the cost of servicing a car that required 3.45 hours of labor if the owner requested that the oil be changed and the fluids be checked?

48. Solve the system of equations algebraically. (*Lesson 2-1*)

$$6x + 5y = -14$$

$$5x + 2y = -3$$

50. Find the slope of a line perpendicular to a line whose equation is $3x - 4y = 0$. (*Lesson 1-5*)

52. Find $[f \circ g](x)$ and $[g \circ f](x)$ if $f(x) = \frac{2}{3}x - 2$ and $g(x) = x^2 - 6x + 9$. (*Lesson 1-2*)

53. **SAT/ACT Practice** If $d = m - \frac{50}{m}$ and m is a positive number that increases in value, then d

A increases in value.

C remains unchanged.

E decreases, then increases.

B increases, then decreases.

D decreases in value.

Determine whether the ordered pair is a solution for the given inequality. Write yes or no.

13. $y < x^3 - 4x^2 + 2$, $(1, 0)$

$0 < 1 - 4$

$0 < -3$ no.

15. $y > -\sqrt{x+11} + 1$, $(-2, -1)$

$-1 > -\sqrt{-2+11}$

$-1 > -3$ yes.

14. $y < |x-2| + 7$, $(3, 8)$

$8 < |3-2| + 7$

$8 < 8$ no.

16. $y < -0.2x^2 + 9x - 7$, $(10, 63)$

$63 < -20 + 90 - 7$

$63 < 63$ no.

Graph each inequality.

20. $y \leq x^2 - 4$ $0 \leq -4$ T

23. $y > |2x| + 3$ $0 > 3$ F

26. $y > -(0.4x)^2$ $0 > 0$ T

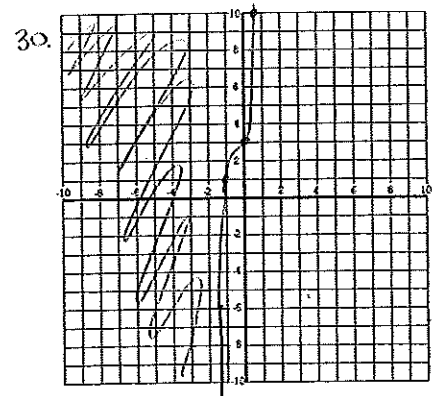
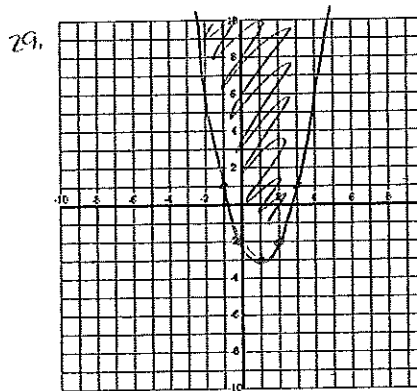
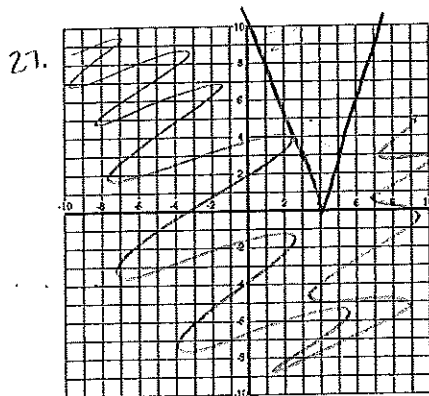
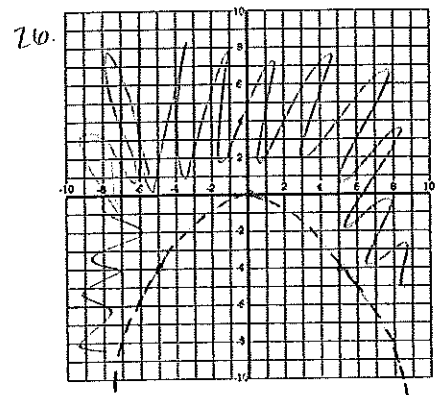
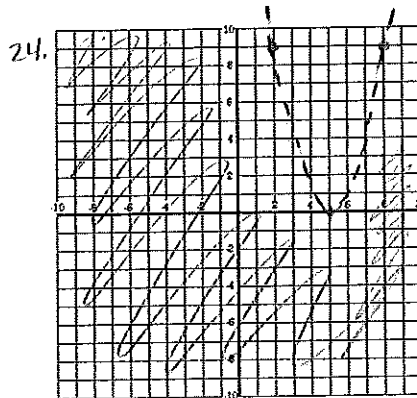
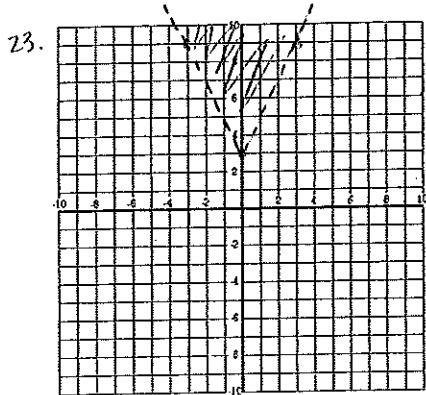
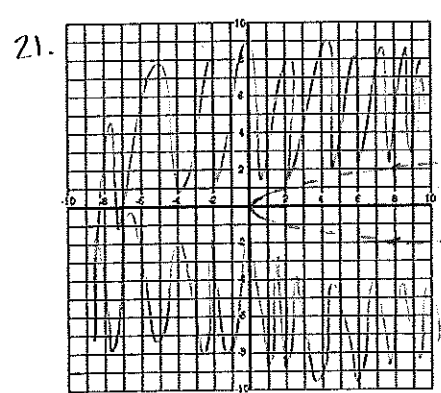
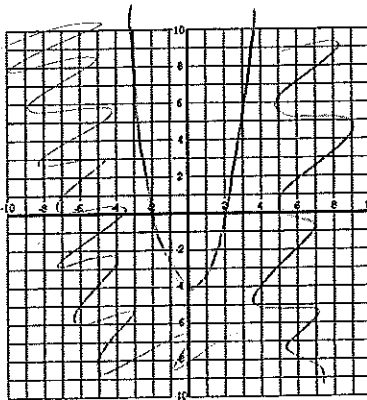
29. $y \geq (x-1)^2 - 3$ $0 \geq -2$ F

21. $y > \sqrt{0.5x}$ $0 > 0$ T

24. $y < (x-5)^2$ $0 < 25$ T

27. $y \leq |3(x-4)|$ $0 \leq 12$ T

30. $y \geq (2x+1)^3 + 2$ $0 \geq 2$ F



Solve each inequality.

$$33. |x + 4| > 5$$

$$x + 4 = 5 \quad x + 4 = -5$$

$$x = 1 \quad \text{OR} \quad x = -9$$

$$34. |3x + 12| \geq 42$$

$$3x + 12 = 42 \quad 3x + 12 = -42$$

$$3x = 30 \quad 3x = -54$$

$$x = 10 \quad \text{OR} \quad x = -18$$

$$35. |7 - 2x| - 8 < 3$$

$$|7 - 2x| < 11$$

$$7 - 2x = 11 \quad 7 - 2x = -11$$

$$-2x = 4 \quad -2x = -18$$

$$x = -2 \quad \text{OR} \quad x = 9$$

$$36. |5 - x| \leq x$$

$$5 - x = x \quad 5 - x = -x$$

$$5 = 2x \quad 5 = 0$$

$$2.5 = x$$

After you work each problem, record your answer on the answer sheet provided or on a piece of paper.

Multiple Choice

1. For all $y \neq 3$, $\frac{y^2 - 9}{3y - 9} = ?$ $\frac{(y+3)(y-3)}{3(y-3)} = \frac{y+3}{3}$

- A y
- B $\frac{y+1}{8}$
- C $y + 1$
- D $\frac{y}{3}$

E $\frac{y+3}{3}$

2. If $x + y = z$ and $x = y$, then all of the following are true EXCEPT

- A $2x + 2y = 2z$
- B $x - y = 0$
- C $x - z = y - z$
- D $x = \frac{z}{2}$

E $z - y = 2x$

53. **SAT Practice Grid-In** Student A is 15 years old. Student B is one-third older. How many years ago was student B twice as old as student A?

15	14	13	12	11	10	9	8	7	6	5	4
20	19	18	17	16	15	14	13	12	11	10	9

10 years ago.

3. The Kims drove 450 miles in each direction to Grandmother's house and back again. If their car gets 25 miles per gallon and their cost for gasoline was \$1.25 per gallon for the trip to Grandmother's house, but \$1.50 per gallon for the return trip, how much *more* money did they spend for gasoline returning from Grandmother's house than they spent going to Grandmother's?

$$\frac{450}{25} \cdot 1.25 = 22.5$$

$$\frac{450}{25} \cdot 1.50 = 27.00$$

$$27 - 22.5 = 4.5$$

- A \$2.25
- B \$4.50
- C \$6.25
- D \$9.00
- E \$27.00

4. If $x + 2y = 8$ and $\frac{x}{2} - y = 10$, then $x = ?$

- A -7
- B 0
- C 10
- D 14
- E 28

$$x + (-10 + \frac{x}{2}) = 8$$

$$2x - 20 + x = 8$$

$$3x = 28$$

$$x = 14$$

5. $\frac{900}{10} + \frac{90}{100} + \frac{9}{1000} =$

- A 90.09
- B 90.099
- C 90.909
- D 99.09
- E 999