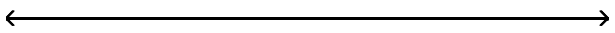
Final Exam REVIEW– Intermediate Algebra

Solve the inequality. Write the solution set in interval notation and graph the solution set.

1) $7z - 7 \geq 6z - 7$ 1) _____



Solve the compound inequality. Graph the solution set and write it in interval notation.

2) $9x - 6 < 3x$ or $-4x \leq -12$ 2) _____

Solve the absolute value equation.

3) $|3x + 8| = |-7 + 6x|$ 3) _____

Solve the equation for the specified variable.

4) $\frac{1}{p} + \frac{1}{q} = \frac{1}{f}$ for f 4) _____

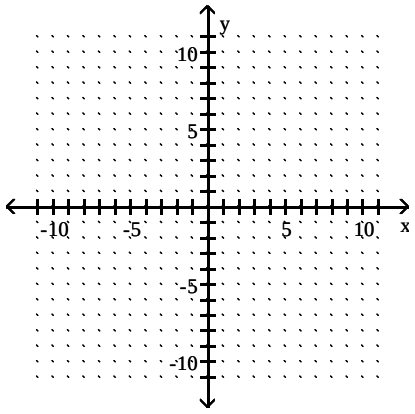
5) $P = \frac{A}{1 + rt}$ for r 5) _____

Solve the equation.

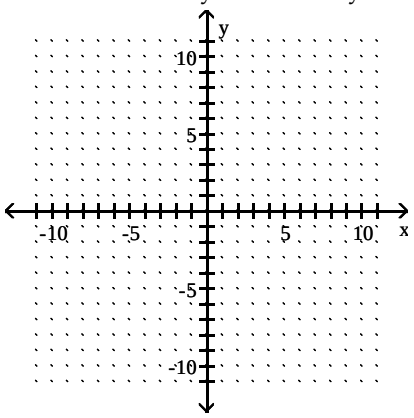
6) $8x + 7 + 8x - 3 = 5x + 11x + 1$ 6) _____

Graph the union or intersection, as indicated.

7) The intersection of $x \geq -2$ and $x \leq 5$ 7) _____



8) The union of $x + y > 2$ or $x - y \leq -3$ 8) _____



List the elements of the set.

9) If A = {x | x is an odd integer} and B = {−11, −9, −8, −6}, list the elements of A ∩ B. 9) _____

Find the domain of the rational function in interval notation.

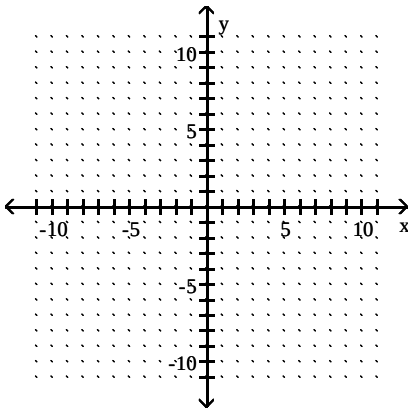
10) $f(x) = \dfrac{x^3 + 6x^4}{x^2 + 16}$ 10) _____

Write the inequality.

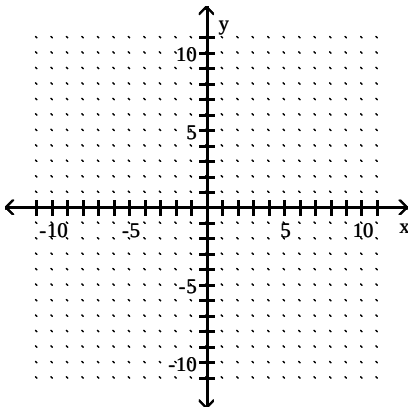
11) Write $-8 \leq x \leq 8$ as an inequality containing absolute value. 11) _____

Graph the union or intersection, as indicated.

12) The intersection of $x + y \leq -5$ and $x - y \geq -2$ 12) _____

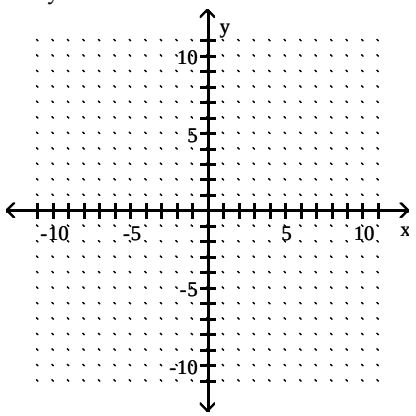


13) The intersection of $x - y < -2$ and $x > -3$ 13) _____



Graph the inequality.

14) $x - y > -3$ 14) _____



Solve the equation.

15) $5x^3 + 3x^2 = 45x + 27$ 15) _____

Use the square root property to solve the quadratic equation.

16) $(2x + 3)^2 = 25$ 16) _____

Factor the polynomial completely.

17) $128x^3 + 54$ 17) _____

18) $75x^2y - 147y$ 18) _____

19) $36x^2 + 12x + 1$ 19) _____

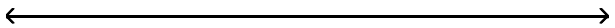
Solve the absolute value equation.

20) $|5x + 2| + 8 = 12$ 20) _____

Solve the inequality. Graph the solution. Write the solution in interval notation.

21) $|x - 5| + 8 \leq 10$ 21) _____

22) $|x - 8| \geq 0$ 22) _____



23) $|x| > -4$ 23) _____

Solve the compound inequality. Graph the solution. Write the solution in interval notation.

24) $9x < 36$ and $x + 9 > 7$ 24) _____

Solve the inequality. Graph the solution. Write the solution in interval notation.

25) $|6k + 8| < -3$ 25) _____

Solve the inequality. Graph the solution.

26) $5x + 8 > 5(x + 11)$ 26) _____

Solve the compound inequality. Graph the solution. Write the solution in interval notation.

27) $-14 \le -2c - 2 < -8$ 27) _____

Write the function in the form $f(x) = a(x - h)^2 + k$.

28) $f(x) = -x^2 + x + 1$ 28) _____

Solve the equation by completing the square.

29) $x^2 + 3x - 9 = 0$ 29) _____

30) $x^2 + x + 5 = 0$ 30) _____

Use the discriminant to determine the number and type of solutions of the equation.

31) $4x^2 - 8x + 4 = 0$ 31) _____

32) $7x^2 = -3x - 8$ 32) _____

Use the quadratic formula to solve the equation.

33) $2x^2 + 10x = -7$ 33) _____

34) $x(x + 6) = 6$ 34) _____

For the given functions f and g, find the requested function.

35) $f(x) = \sqrt[3]{x}$; $g(x) = 6x - 10$ Find $(f - g)(x)$. 35) _____

36) $f(x) = 9x^4$; $g(x) = 3x^2$ Find $\left(\frac{f}{g}\right)(x)$. 36) _____

37) $f(x) = \sqrt{x}$; $g(x) = 5x - 3$ Find $\left(\frac{f}{g}\right)(x)$. 37) _____

Find the domain of the rational function in interval notation.

38) $f(x) = \dfrac{1 - 2x}{x^3 - 10x^2 + 21x}$ 38) _____

Divide using synthetic division.

39) $\dfrac{x^4 + 3x^3 + x^2 + 5x + 5}{x + 1}$ 39) _____

Use the Remainder Theorem (and synthetic division) to evaluate the function at the given c.

40) $P(x) = x^5 + 6x^4 + 2x^3 + 9;\ \ 2$ 40) _____

Use the properties of exponents to simplify the expression.

41) $y^{5/9}\left(y^{3/9} - 9y^{2/9}\right)$ 41) _____

Simplify.

42) $\dfrac{x^2 + 9x + 20}{x^2 + 14x + 45} \div \dfrac{x^2 + 4x}{x^2 + 11x + 18}$ 42) _____

Simplify.

43) $\dfrac{\dfrac{2}{x + 3} - \dfrac{2}{x - 3}}{\dfrac{7}{x^2 - 9}}$ 43) _____

Simplify.

44) $\dfrac{\dfrac{2}{x} - \dfrac{5}{y} - \dfrac{3}{xy}}{5y^{-1} + 2x^{-3}}$ 44) _____

Simplify.

45) $\dfrac{x^3 - 64}{4 - x}$ 45) _____

Simplify.

46) $-\sqrt[3]{-64x^{18}y^{36}}$ 46) _____

Perform the indicated operation.

47) $\dfrac{12}{x^2 + 4x} + \dfrac{7}{x} + \dfrac{3}{x + 4}$ 47) _____

Solve the equation.

48) $2x^{2/3} - 3x^{1/3} - 20 = 0$ 48) _____

Solve.

49) $(3x - 6)^2 + 9(3x - 6) = -20$ 49) _____

50) $(x - 2)^2 = -18$ 50) _____

Solve the equation.

51) $x^4 = 81$ 51) _____

52) $\sqrt{3x - 8} = 6 - x$ 52) _____

Add or subtract. Assume all variables represent positive real numbers.

53) $\sqrt{3x^2} + 7\sqrt{48x^2} + 5\sqrt{48x^2}$ 53) _____

Rationalize the denominator and simplify. Assume that all variables represent positive real numbers.

54) $\dfrac{9x}{\sqrt[5]{25x^{12}y^{18}}}$ 54) _____

55) $\dfrac{2\sqrt{7} + \sqrt{49}}{4\sqrt{7} - \sqrt{49}}$ 55) _____

Perform the indicated operation. Write the result in the form a + bi.

56) $\dfrac{1 - 7i}{4 + i}$ 56) _____

Solve the problem.

57) A painter can finish painting a room in 5 hours while her assistant takes 7 hours to finish the same job. How long would it take them to complete the job if they work together? 57) _____

For the given functions f and g, find the composition.

58) $f(x) = \sqrt{x + 9}$; $g(x) = 8x - 13$ Find: $(g \circ f)(x)$ 58) _____

Solve the problem.

59) An arrow is fired into the air with an initial velocity of 96 feet per second. The height in feet of the arrow t seconds after it was shot into the air is given by the function $h(t) = -16t^2 + 96t$. Find the maximum height of the arrow. 59) _____

60) Jerod can run 5 miles per hour on level ground on a still day. One windy day, he runs 10 miles with the wind, and in the same amount of time runs 4 miles against the wind. What is the rate of the wind? 60) _____

61) The cost in millions of dollars for a company to manufacture x thousand automobiles is given by the function $C(x) = 3x^2 - 12x + 28$. Find the number of automobiles that must be produced to minimize the cost. 61) _____

For the given functions f and g, find the composition.

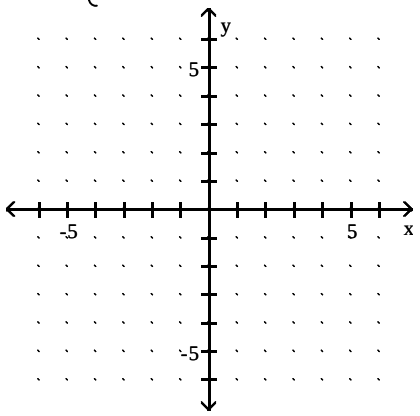
62) $f(x) = x^3 + 8x$; $g(x) = -2x$
Find: $(g \circ f)(x)$ 62) _____

Graph the function. State the Domain and Range.

63) 63) _____

$$f(x) = \begin{cases} 5x + 1 & \text{if } x \le 0 \\ \frac{1}{4}x - 4 & \text{if } x > 0 \end{cases}$$

Domain: Range:



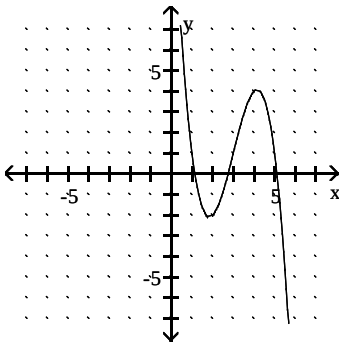
Solve the problem.

64) Find the midpoint of the line segment whose endpoints are $\left(\frac{3}{2}, \frac{3}{4}\right), \left(-4, -\frac{1}{4}\right)$. 64) _____

65) Find the distance between the points (–5, 1) and (7, 7). 65) _____

Find the indicated value.

66) Use the graph to determine f(3). 66) _____



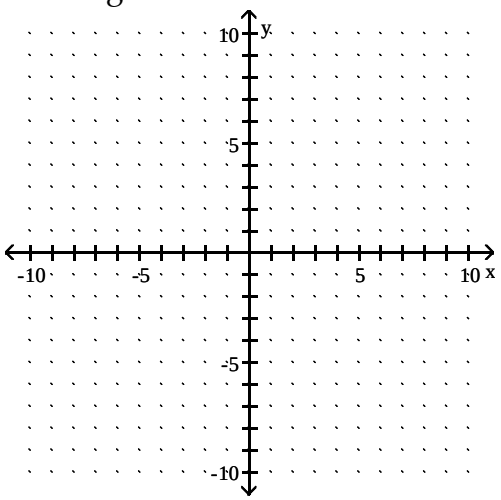
Graph the function. State the Domain and Range.

67) $f(x) = \begin{cases} x + 5 & \text{if } x < 2 \\ -x + 5 & \text{if } x > 2 \end{cases}$

Domain:

Range:

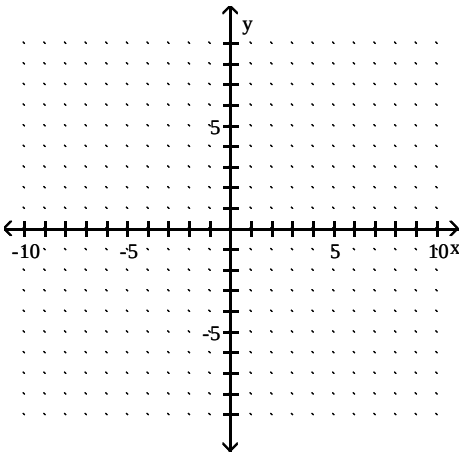
67) _____



Graph the function. State the Domain and Range.

68) $f(x) = \begin{cases} 1 & \text{if } x < -6 \\ -6 & \text{if } x \geq -6 \end{cases}$

68) _____

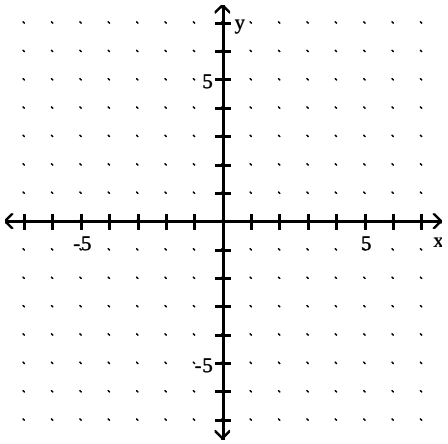


Domain: Range:

Sketch the graph of the quadratic function. Give the vertex and the axis of symmetry.

69) $f(x) = x^2 - 4x + 5$

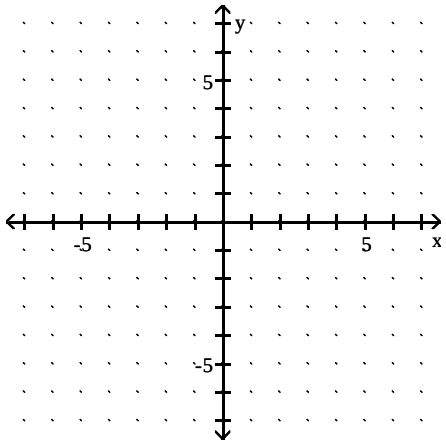
69) _____



Vertex: Axis of symmetry:

Graph the function. Identify the Domain and Range.

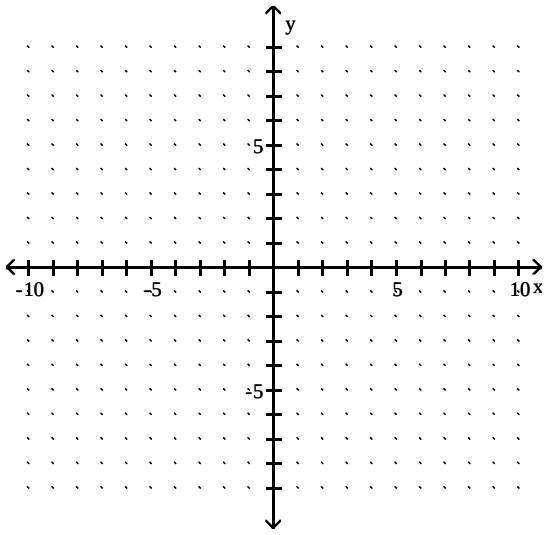
70) $f(x) = -\sqrt{x - 1}$ 70) _____



Domain: Range:

Sketch the graph of the given function. Give the vertex and axis of symmetry.

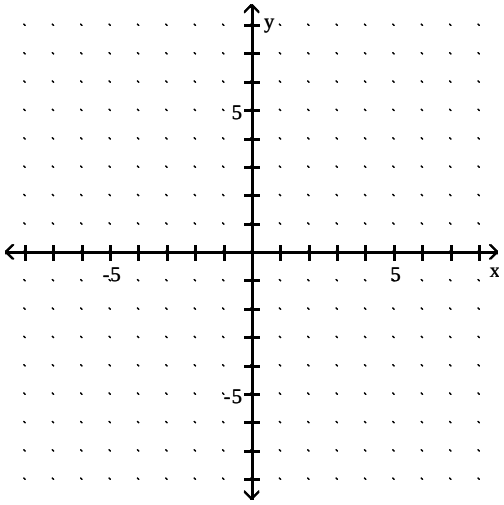
71) $h(x) = -(x - 4)^2 + 3$ 71) _____



Vertex: Axis of symmetry:

Graph the function. Identify the Domain and Range.

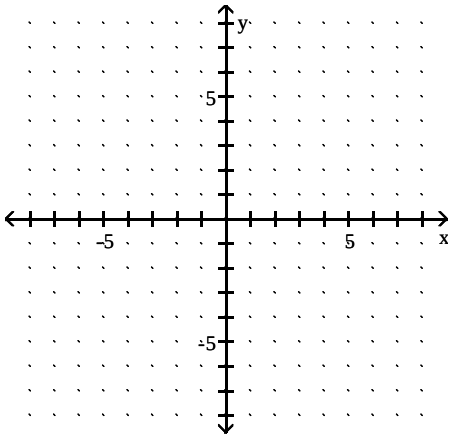
72) $f(x) = \sqrt{x + 4} - 7$ 72) _____



Domain: Range:

Sketch the graph the function. Identify the domain and range.

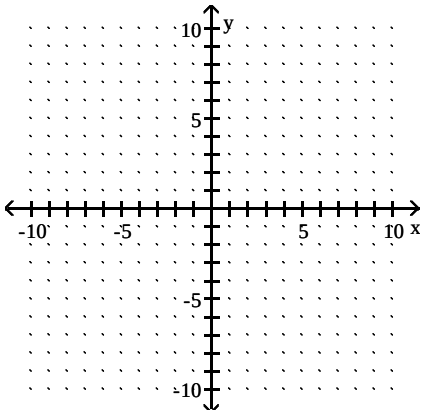
73) $f(x) = -|x + 5|$ 73) _____



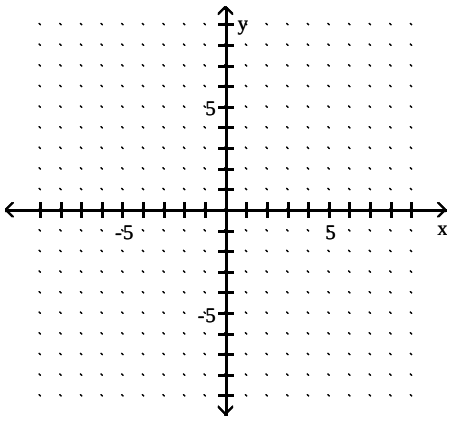
Domain: Range:

Sketch the graph of the function.

74) $h(x) = 2|x| - 9$ 74) _____



75) $g(x) = -\frac{1}{5}|x| - 4$ 75) _____



Solve the inequality. Graph the solution set and write the solution set in interval notation.

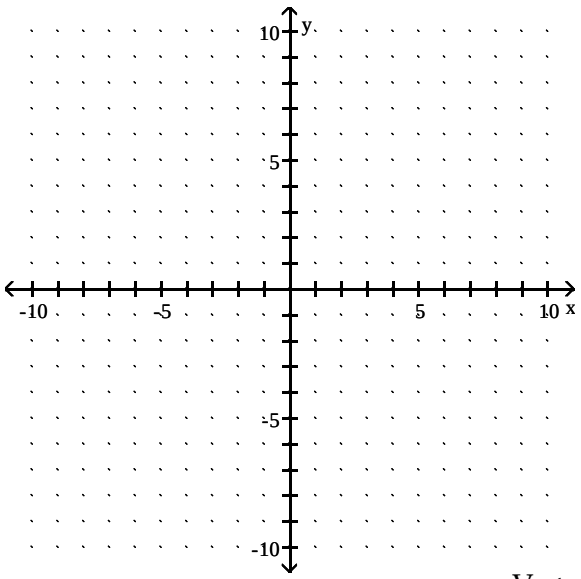
76) $x^2 + 2x \geq 3$ 76) _____

77) $16x^3 + 80x^2 - 25x - 125 > 0$ 77) _____

78) $\frac{-7}{-6x - 7} > 0$ 78) _____

Graph the function. Determine the vertex, the axis of symmetry, and the y –intercept.

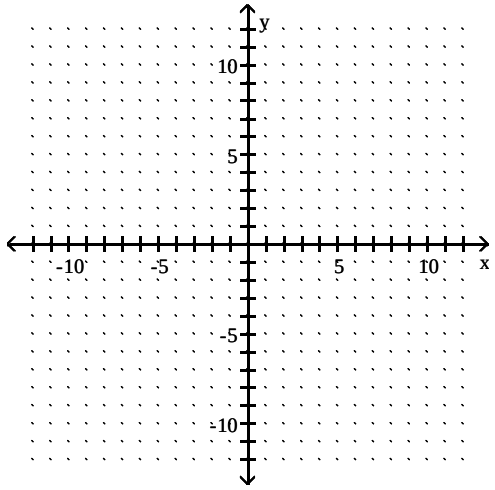
79) $f(x) = -3(x - 2)^2 + 3$ 79) _____



Vertex: Axis of symmetry: y –int

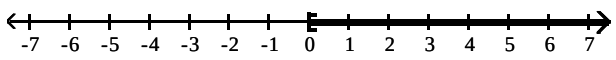
Sketch the graph of the quadratic function. Give the vertex and axis of symmetry.

80) $f(x) = \frac{1}{5}(x - 4)^2 + 1$ 80) _____

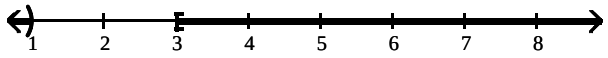


Vertex: Axis of symmetry:

1) $[0, \infty)$



2) $(-\infty, 1) \cup [3, \infty)$



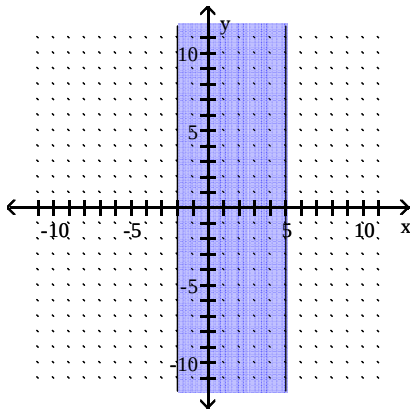
3) $\left\{-\frac{1}{9}, 5\right\}$

4) $f = \frac{pq}{p + q}$

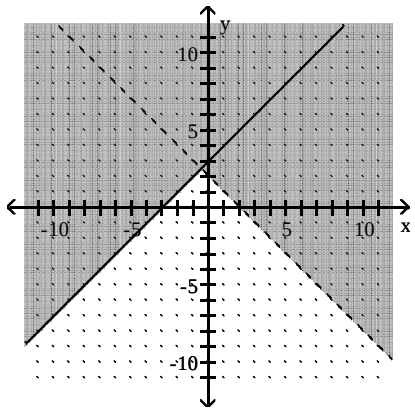
5) $r = \frac{A - P}{Pt}$

6) $\varnothing$

7)



8)

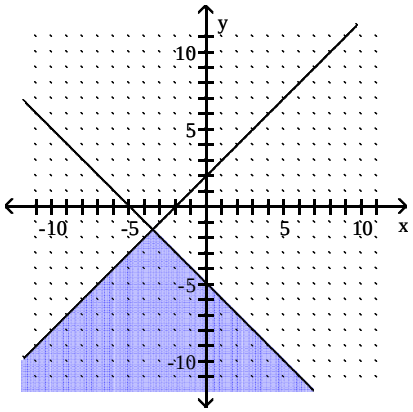


9) $\{-11, -9\}$

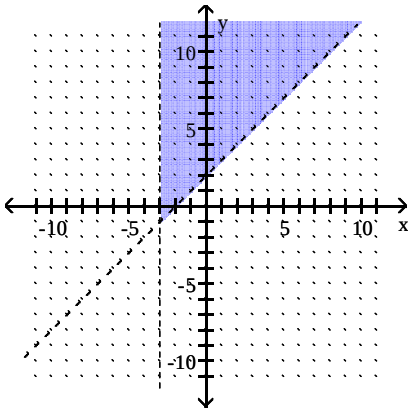
10) $(-\infty, \infty)$

11) $|x| \leq 8$

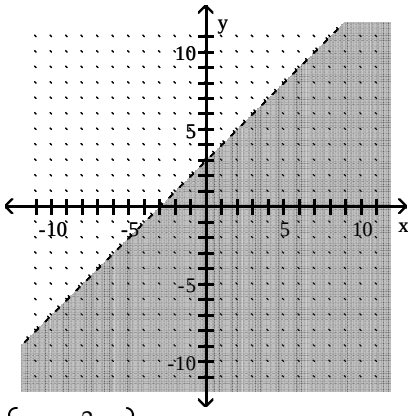
12)



13)



14)



15) $\left\{-3, -\frac{3}{5}, 3\right\}$

16) $\{1, -4\}$

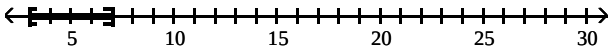
17) $2(4x + 3)(16x^2 - 12x + 9)$

18) $3y(5x + 7)(5x - 7)$

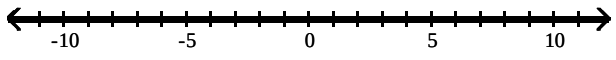
19) $(6x + 1)^2$

20) $\left\{\frac{2}{5}, -\frac{6}{5}\right\}$

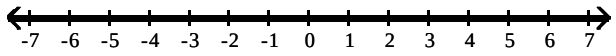
21) $[3, 7]$



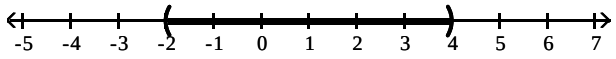
22) $(-\infty, \infty)$



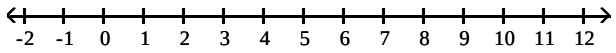
23) $(-\infty, \infty)$



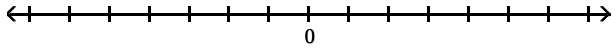
24) $(-2, 4)$



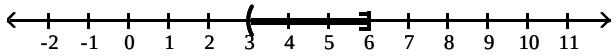
25) $\emptyset$



26) $\emptyset$



27) $(3, 6]$



28) $f(x) = -\left(x - \frac{1}{2}\right)^2 + \frac{5}{4}$

29) $\left\{\frac{-3 - 3\sqrt{5}}{2}, \frac{-3 + 3\sqrt{5}}{2}\right\}$

30) $\left\{\frac{-1 - i\sqrt{19}}{2}, \frac{-1 + i\sqrt{19}}{2}\right\}$

31) one real solution

32) two complex but not real solutions

33) $\left\{\frac{-5 - \sqrt{11}}{2}, \frac{-5 + \sqrt{11}}{2}\right\}$

34) $\left\{-3 - \sqrt{15}, -3 + \sqrt{15}\right\}$

35) $(f - g)(x) = \sqrt[3]{x} - 6x + 10$

36) $\left(\frac{f}{g}\right)(x) = 3x^2$, where $x \neq 0$

37) $\left(\frac{f}{g}\right)(x) = \frac{\sqrt{x}}{5x - 3}$, where $x \neq \frac{3}{5}$

38) $(-\infty,0) \cup (0,3) \cup (3,7) \cup (7,\infty)$

39) $x^3 + 2x^2 - x + 6 - \frac{1}{x + 1}$

40) $P(2) = 153$

41) $y^{8/9} - 9y^{7/9}$

42) $\frac{x + 2}{x}$

43) $-\frac{12}{7}$

44) $\frac{2x^2y - 5x^3 - 3x^2}{5x^3 + 2y}$

45) $-x^2 - 4x - 16$

46) $4x^6y^{12}$

47) $\frac{10}{x}$

48) $\left\{64, -\frac{125}{8}\right\}$

49) $\left\{\frac{2}{3}, \frac{1}{3}\right\}$

50) $\left\{2 - 3\sqrt{2}\,i, 2 + 3\sqrt{2}\,i\right\}$

51) $\{-3, 3, -3i, 3i\}$

52) $\{4\}$

53) $49x\sqrt{3}$

54) $\frac{9\sqrt[5]{125x^3y^2}}{5x^2y^4}$

55) $\frac{5 + 2\sqrt{7}}{3}$

56) $-\frac{3}{17} - \frac{29}{17}i$

57) $2\frac{11}{12}$ hours

58) $8\sqrt{x + 9} - 13$

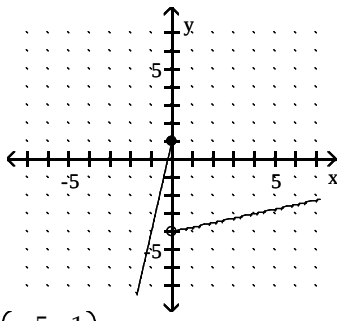
59) 144 ft

60) $2\frac{1}{7}$ mph

61) 2 thousand automobiles

62) $-2x^3 - 16x$

63) Domain: $(-\infty,\infty)$; Range: $(-\infty,\infty)$

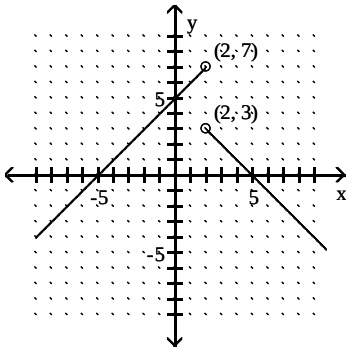


64) $\left(-\frac{5}{4}, \frac{1}{4}\right)$

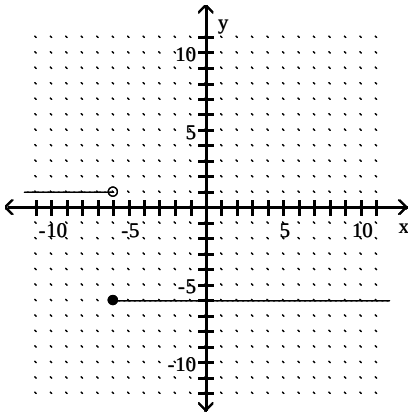
65) $6\sqrt{5}$ units

66) $f(3) = 1$

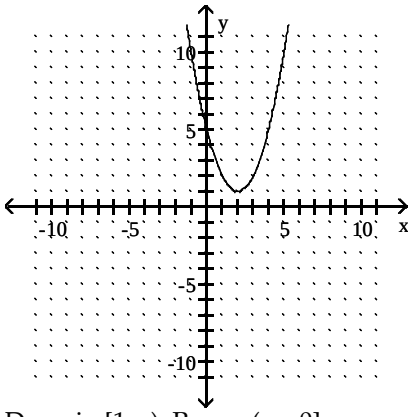
67) Domain: $(-\infty,2)\cup(2,\infty)$; Range: $(-\infty,7)$



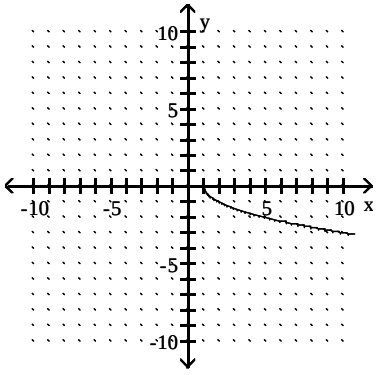
68) Domain: $(-\infty,\infty)$; Range: $\{-6,1\}$



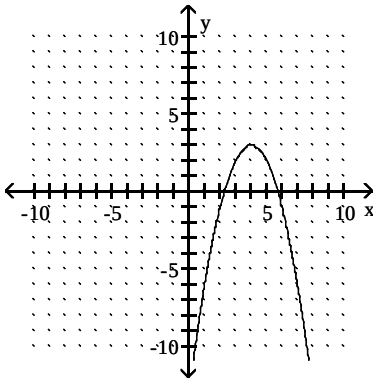
69) vertex: (2, 1); axis x = 2



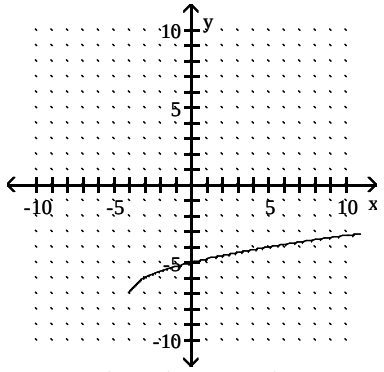
70) Domain $[1,\infty)$; Range $(-\infty,0]$



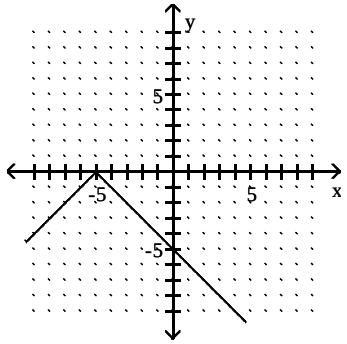
71) vertex: (4,3); axis x= 4



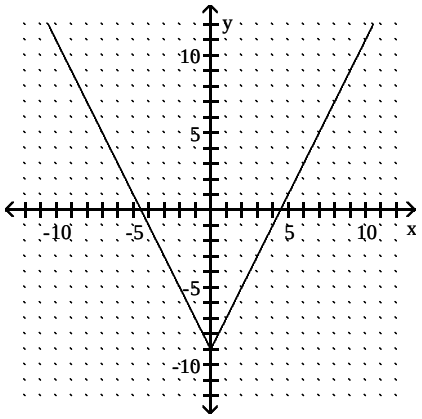
72) Domain $[-4,\infty)$; Range $[-7,\infty)$



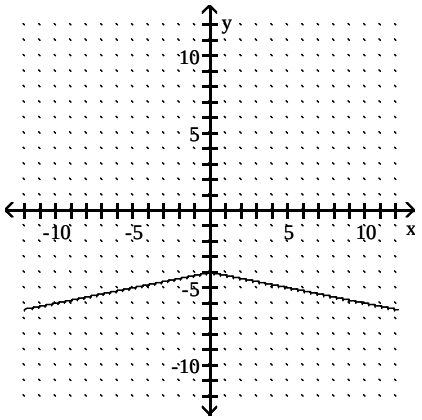
73) Domain $(-\infty,\infty)$; Range $(-\infty,0]$



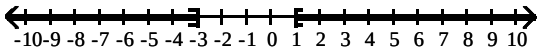
74)



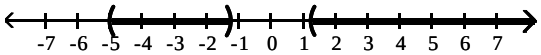
75)



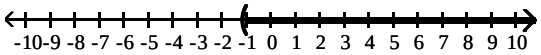
76) $(-\infty, -3] \cup [1, \infty)$



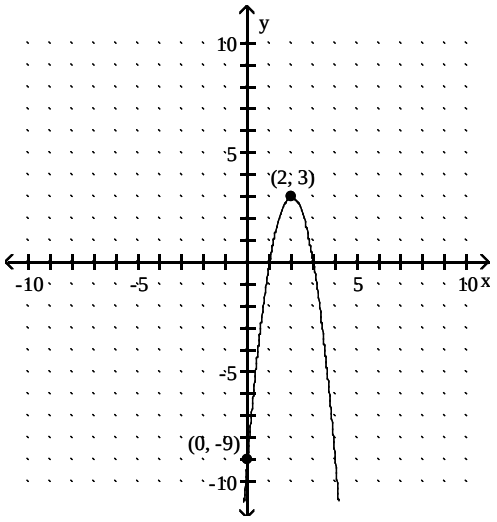
77) $\left(-5, -\frac{5}{4}\right) \cup \left(\frac{5}{4}, \infty\right)$



78) $\left(-\frac{7}{6}, \infty\right)$



79) vertex: (2, 3); axis: x = 2; y–int: (0,–9)



80) vertex: (4, 1); axis: x = 4