

**Solve the problem.**

- 1) City B is located at 100 miles east and 50 miles north of city A. City C is located at 75 miles west and 150 miles south of city A. Find the distance between city B and city C. You can choose city A as the origin of the rectangular coordinate system. Write your answer rounded to two decimal places, if necessary.

**Use the graph of the given equation obtained on a graphing utility to approximate the intercepts to two decimal places.**

2)  $4x^2 - 5y = 68$

**Using a graphing utility, find the intercepts of the graph of the equation given. Approximate your answers rounded to three decimal places.**

3) Find the x- and y-intercepts of  $y = x^3 - 3x^2 - 45x - 16$ .

**Write the standard form of the equation for the circle.**

- 4) Give the equation for a circle.  
Center at  $(2, -4)$ , radius  $\sqrt{2}$

**Write the standard form of the equation of a circle with the given properties.**

- 5) Center is at  $(-2, 3)$ , passing through the point  $(-1, -1)$ .

**Find the center  $(h, k)$  and radius  $r$  of the circle. Graph the circle.**

6) Find the center, radius, and graph of  $x^2 + y^2 - 4x + 8y + 11 = 0$ .

**Find the center and radius of the circle with the given equation.**

7)  $4x^2 + 4y^2 - 12x + 16y - 5 = 0$

**Find the general form of the equation for the circle with the given properties.**

- 8) With endpoints of a diameter at  $(5, 9)$  and  $(-1, 3)$ .

**Use a graphing utility to approximate the real solutions, if any, of the equation rounded to two decimal places.**

9)  $-x^4 + 3x^3 + \frac{4}{3}x^2 = \frac{9}{2}x + 2$

**Solve the equation.**

10)  $1 - \frac{9}{5x} = \frac{7}{3}$

11)  $x^3 + 5x^2 - x - 5 = 0$

**Solve by factoring.**

12)  $3k^2 - 23k - 8 = 0$

**Use the quadratic formula to solve the equation.**

13)  $6 = -\frac{12}{x} - \frac{1}{x^2}$

**Solve the problem.**

- 14) The amount of oxygen dissolved in a stream varies with the temperature of water. Assuming that this relationship is linear, the amount of dissolved oxygen is measured at two different temperatures. At  $31^\circ\text{C}$ , the dissolved oxygen is 6.4 parts per million, and at  $11^\circ\text{C}$ , the dissolved oxygen is 10.2 parts per million. Trout, a kind of fish, need a minimum of 6 parts per million to live. Find the maximum temperature rounded to one decimal place, at which the trout can survive.

**Write an equation for the line.**

- 15) Write the slope-intercept form of the equation of the line passing through the point (2, 6) and parallel to the line  $y = -4x - 1$ .
- A)  $y = -4x + 26$                       B)  $y = 4x - 26$                       C)  $y = 4x - 14$                       D)  $y = -4x + 14$

**Solve the problem.**

- 16) A truck rental company rents a moving truck one day by charging \$31 plus \$0.09 per mile. Write a linear equation that relates the cost  $C$ , in dollars, of renting the truck to the number  $x$  of miles driven. What is the cost of renting the truck if the truck is driven 210 miles?
- 17) If  $f(x) = 7x^3 + 8x^2 - x + C$  and  $f(-3) = 1$ , what is the value of  $C$ ?

**Evaluate the function. Express the answer in simplified form.**

- 18)  $f(x) = 3x^2 - 5x + 2$ . Evaluate  $\frac{f(x+h) - f(x)}{h}$ , where  $h \neq 0$

**Give the domain of the function.**

19)  $f(x) = \frac{\sqrt{x+7}}{(x+5)(x+7)}$

**Find the domain of the function.**

20)  $\frac{x}{\sqrt{x-3}}$

**Solve the problem.**

- 21) A company produces a product for which the variable cost is \$12.50 per unit and the fixed costs are \$95,000. The product sells for \$17.80. Let  $x$  represent the number of units produced and sold. Write the profit,  $P$ , as a function of units sold. Profit is obtained by subtracting the costs from the revenue.
- 22) Find the average rate of change of  $h(x) = 4x^3 - 5x + 2$  from  $-2$  to  $x$ .

**Find the average rate of change for the function over the given interval.**

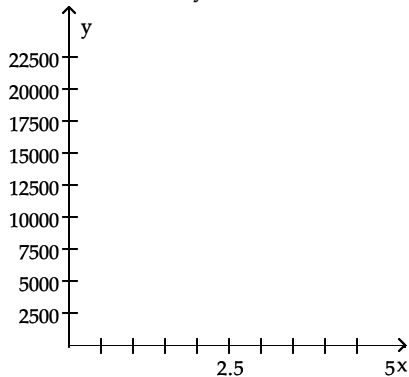
23)  $f(x) = \frac{3}{x-2}$  between  $x = 4$  and  $x = 7$

**Using a graphing utility, determine where the function is increasing and decreasing. Round answers to 3 decimal places.**

24)  $f(x) = 4x^3 - 5x^2 - 7x + 3$

**Solve the problem.**

- 25) Suppose that a school has just purchased new computer equipment for \$15,000.00. The school chooses to depreciate the equipment using the straight line method over 5 years. (a) Write a linear function that expresses the book value of the equipment as a function of its age. (b) Graph the linear function. (c) What is the value of the machine after 2 years?



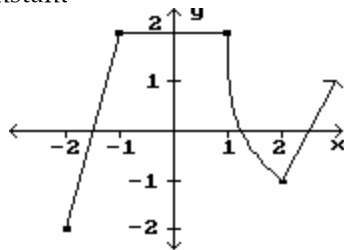
**Solve the problem. Use a graphing calculator to graph the data.**

- 26) A drug company establishes that the most effective dose of a new drug relates to body weight as shown below. Let body weight be the independent variable and drug dosage be the dependent variable. Use a graphing utility to draw a scatter diagram and to find the line of best fit. What is the most effective dosage for a person weighing 110 lbs?

Body Weight (lbs)	Drug Dosage (mg)
50	10
100	11
150	16
200	17
250	19

**Identify the intervals where the function is changing as requested.**

- 27) Constant

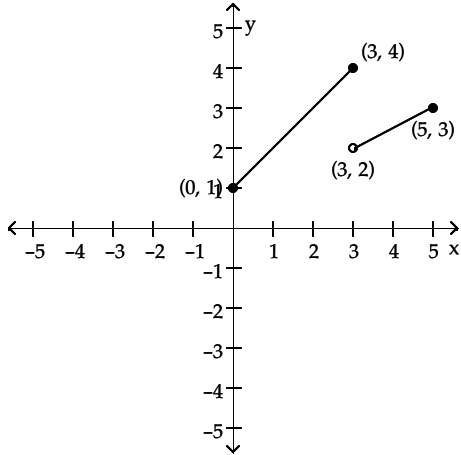


**Solve the problem.**

- 28) An open box of maximum volume is to be from a square piece of material, 20 inches on a side, by cutting out equal squares, of length  $x$ , from the corners and turning up the sides. The volume of the resulting box is given by  $V(x) = 4x(10 - x)^2$ . Using a graphing utility, find the maximum volume of the resulting box. Approximate answer rounded to one decimal place, if necessary.

The graph of a piecewise-defined function is given. Write a definition for the function.

29)



Solve the problem.

30) One Internet service provider has the following rate schedule for high-speed Internet service:

Monthly service charge	\$18.00
1st 50 hours of use	free
Next 50 hours of use	\$0.25/hour
Over 100 hours of use	\$1.00/hour

What is the charge for 50 hours of high-speed Internet use in one month?

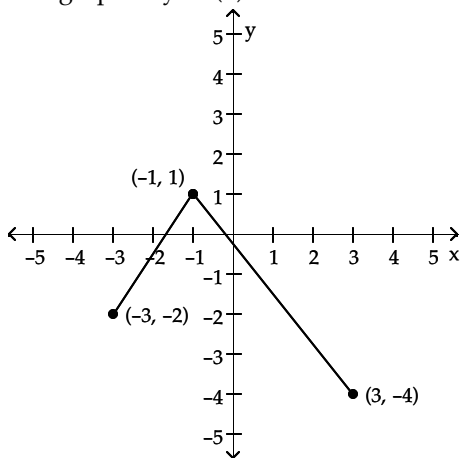
What is the charge for 75 hours of high-speed Internet use in one month?

What is the charge for 135 hours of high-speed Internet use in one month?

31) Evaluate the expression  $3f(-2) + 4f(2) + 5f(0)$ , given  $f(x) = \begin{cases} 2x - 3 & \text{if } x < 0 \\ x + 1 & \text{if } x \geq 0 \end{cases}$ .

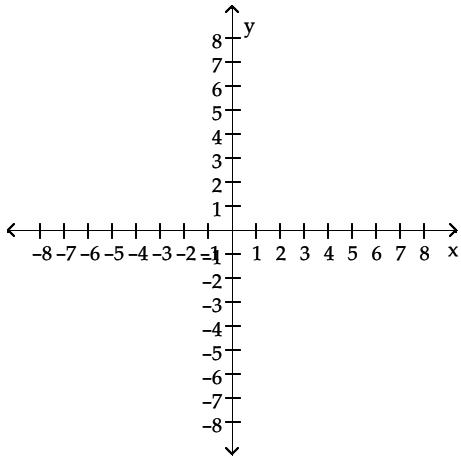
Using transformations, sketch the graph of the function.

32) The graph of  $y = f(x)$  is as shown. Sketch the graph of  $y = f(x + 2) - 1$



**Graph the function.**

- 33) Graph the function whose graph is that of  $y = x^3 - x^2 - 6x$  but is reflected about the y-axis.

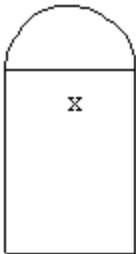


**Find the function.**

- 34) Find the function that is finally graphed after the following transformations are applied to the graph of  $y = |x|$ . The graph is shifted right 3 units, stretched by a factor of 3, shifted vertically down 2 units, and finally reflected across the x-axis.

**Solve the problem.**

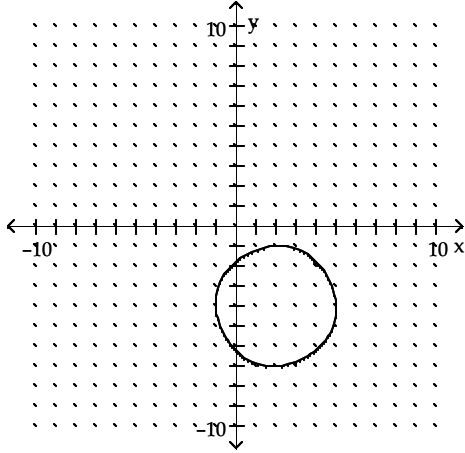
- 35) An open box with a square base is required to have a volume of 27 cubic feet. Express the amount  $A$  of material used to make such a box as a function of the length  $x$  of a side of the base.
- 36) A window has the shape of a rectangle surmounted by a semicircle. If the perimeter of the window is 40 ft, express the area  $A$  of the window as a function of the width,  $x$ , of the window.



# Answer Key

Testname: CHAP1-2.REV

- 1) 265.75 miles
- 2)  $(0, -13.60), (4.12, 0), (-4.12, 0)$
- 3)  $(-5.144, 0), (-0.366, 0), (8.509, 0), (0, -16)$
- 4)  $(x - 2)^2 + (y + 4)^2 = 2$
- 5)  $(x + 2)^2 + (y - 3)^2 = 17$
- 6) center  $(2, -4); r = 3$



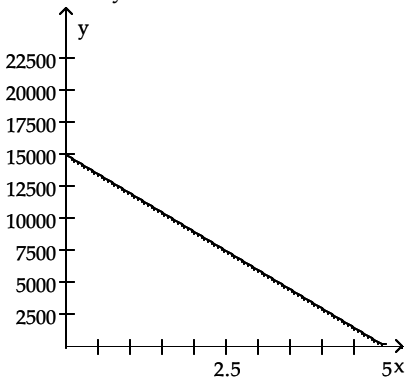
- 7) center =  $(\frac{3}{2}, -2);$  radius =  $\frac{\sqrt{30}}{2}$
- 8)  $x^2 + y^2 - 4x - 12y + 22 = 0$
- 9)  $\{2.82, 1.61, -0.46, -0.97\}$
- 10)  $\{-\frac{27}{20}\}$
- 11)  $x = -1, x = 1, x = -5$
- 12)  $\{-\frac{1}{3}, 8\}$
- 13)  $\{\frac{-6 \pm \sqrt{30}}{6}\}$
- 14)  $33.1^\circ\text{C}$
- 15) D
- 16)  $C = 0.09x + 31, \$49.90$
- 17)  $C = 115$
- 18)  $6x + 3h - 5$
- 19)  $x \geq -7, x \neq -5, x \neq -7$
- 20)  $x > 3$
- 21)  $P(x) = 5.30x - 95000$
- 22)  $\frac{4x^3 - 5x + 22}{x + 2}$
- 23)  $-\frac{3}{10}$
- 24) the graph is increasing on  $(-\infty, -0.453)$  and  $(1.287, \infty);$  decreasing on  $(-0.453, 1.287)$

# Answer Key

Testname: CHAP1-2.REV

25)  $f(x) = -3000x + 15,000$

value after 2 years is \$9000.00



26) 12.68 mg

27)  $(-1, -1)$

28)  $592.6 \text{ in}^3$

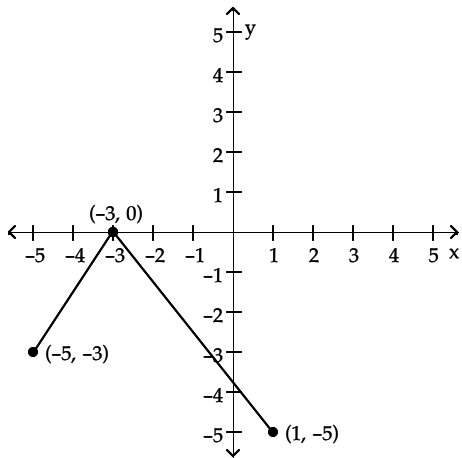
29)  $f(x) = x + 1$  if  $0 \leq x \leq 3$

$f(x) = \frac{1}{2}x + \frac{1}{2}$  if  $3 < x \leq 5$

30) \$18.00; \$24.25; \$65.50

31) -4

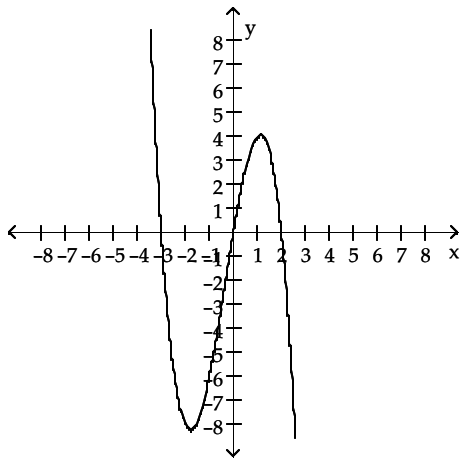
32)



Answer Key

Testname: CHAP1-2.REV

33)



34)  $y = -[3|x - 3| - 2]$

35)  $A = x^2 + \frac{108}{x}$

36)  $A(x) = \frac{160x - x^2(4 + \pi)}{8}$