

Name \_\_\_\_\_

**MULTIPLE CHOICE.** Choose the one alternative that best completes the statement or answers the question.

**Find the requested value.**

1)

$$f(6) \text{ for } f(x) = \begin{cases} 3x + 1 & \text{if } x < 1 \\ 6x & \text{if } 6 \leq x \leq 9 \\ 6 - 6x & \text{if } x > 9 \end{cases}$$

- A) 36                                      B) 55                                      C) 4                                      D) -30

**Find the function value.**

2) For  $f(x) = -|x + 5|$ , find  $f(1)$ .

- A) 1                                      B) -6                                      C) 6                                      D) -5

**Solve the problem.**

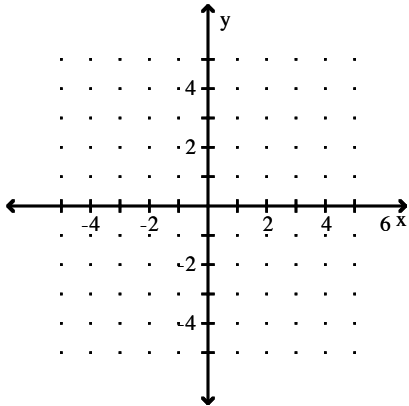
3) If the average cost per unit  $C(x)$  to produce  $x$  units of plywood is given by  $C(x) = \frac{300}{x + 10}$ , what is the unit

cost for 20 units?

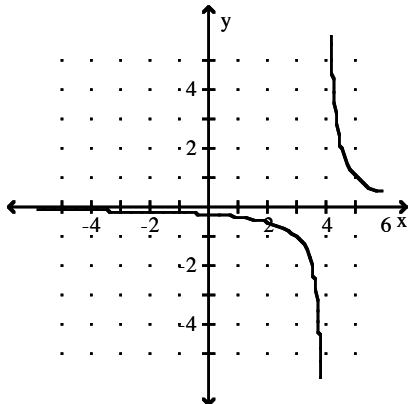
- A) \$10.00                                      B) \$1.50                                      C) \$5.00                                      D) \$15.00

**Graph.**

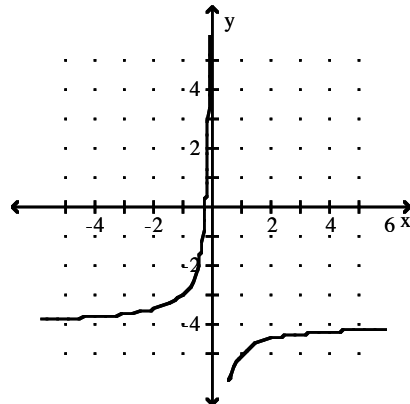
4)  $f(x) = \frac{1}{x} - 4$

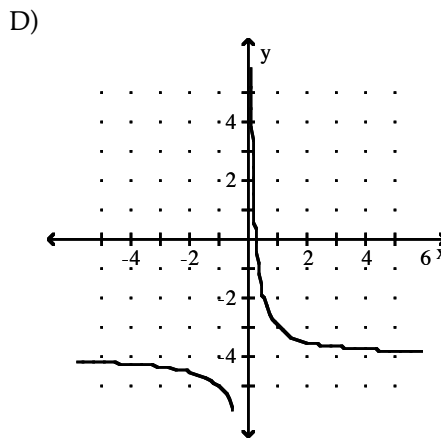
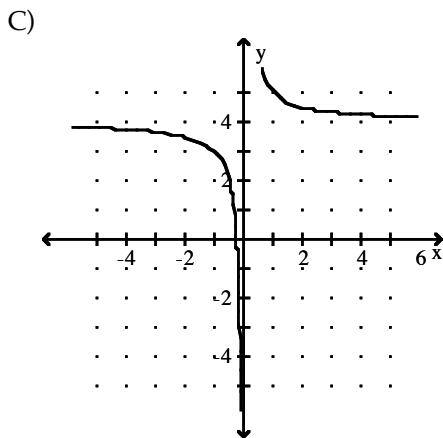


A)



B)





For the given function, find the indicated function value.

5) For  $f(x) = \sqrt[3]{x+1}$ , find  $f(-28)$ .

- A) -4  
C) -3

- B) 3  
D) Does not exist as a real number

Solve the problem.

6) A salesperson gets a commission of \$1000 for the first \$10,000 of sales, and then \$500 for each additional \$10,000 or partial of sales. Let  $S(x)$  represent the commission on  $x$  dollars of sales. Find the value of  $S(75,000)$ .

- A) \$3750                      B) \$4250                      C) \$4750                      D) \$4500

Determine if the function is concave up or concave down in the first quadrant.

7)  $y = x^{3/7}$

- A) Concave down                      B) Concave up

Solve the problem.

8) The number of people present at a stadium holding a big rock concert can be estimated with the following function:

$$y = 13252x^{0.76} + 0.41x + 102,$$

where  $y$  is the number of people present and  $x$  is the amount of time after 3:00 P.M. on the day of the concert. Predict the number of people present at 7:00PM.

- A) 40,390 people                      B) 58,256 people                      C) 38,110 people                      D) 38,109 people

9) Suppose a cost-benefit model is given by  $y = \frac{5.7x}{100-x}$ , where  $y$  is the cost in thousands of dollars for

removing  $x$  percent of a given pollutant. Find the cost of removing 95% to the nearest dollar.

- A) \$108,300                      B) \$5415                      C) \$5700                      D) \$19,000

10) In Country X, the average hourly wage in dollars from 1945 to 1995 can be modeled by

$$f(x) = \begin{cases} 0.078(x - 1945) + 0.33 & \text{if } 1945 \leq x < 1970 \\ 0.187(x - 1970) + 3.04 & \text{if } 1970 \leq x \leq 1995 \end{cases}$$

Use  $f$  to estimate the average hourly wages in 1950, 1970, and 1990.

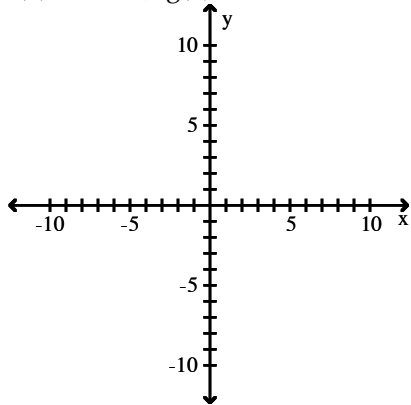
A) \$0.72, \$2.28, \$6.78

B) \$0.72, \$3.04, \$6.78

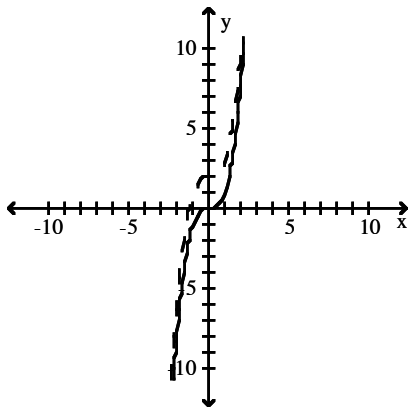
C) \$3.43, \$0.33, \$6.78

Sketch the graph of the pair of functions. Use a dashed line for  $g(x)$ .

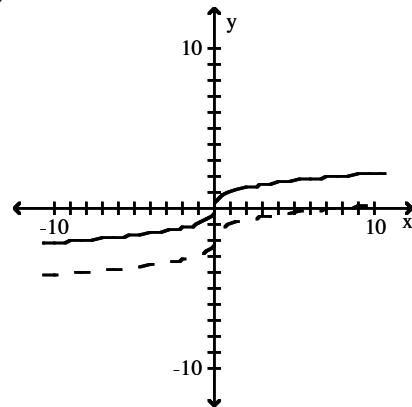
11)  $f(x) = \sqrt[3]{x}$ ,  $g(x) = \sqrt[3]{x} + 2$



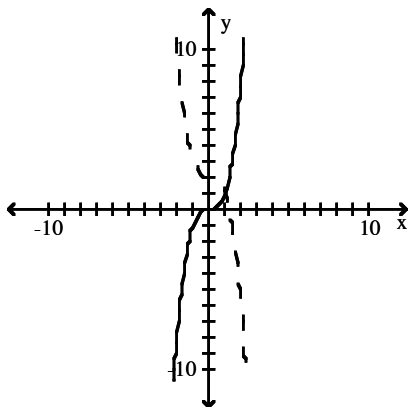
A)



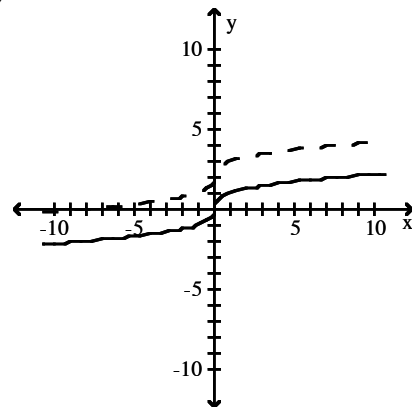
B)



C)



D)



**Write the equation of the graph after the indicated transformation(s).**

12) The graph of  $y = \sqrt{x}$  is shifted 2 units to the left. Then the graph is shifted 3 units upward.

A)  $y = \sqrt{x+3} + 2$

B)  $y = 3\sqrt{x+2}$

C)  $y = \sqrt{x+2} + 3$

D)  $y = \sqrt{x-2} + 3$

**Solve the problem.**

13) The linear equation  $y = 461x + 3420$  provides an approximation of the annual cost (in dollars) of health insurance for a family of three, where  $x = 1$  represents 1988,  $x = 2$  represents 1989, and so on. Write an equation that yields the same  $y$ -values when the exact year number is entered.

A)  $y = 461(1988 - x) + 3420$

B)  $y = 461(x - 1988) + 3420$

C)  $y = 461(1987 - x) + 3420$

D)  $y = 461(x - 1987) + 3420$

**Fill in each blank with the appropriate response.**

14) The graph of  $y = -\frac{1}{5}(x+4)^2 - 8$  can be obtained from the graph of  $y = x^2$  by shifting horizontally \_\_\_ units

to the \_\_\_\_\_, vertically shrinking by a factor of \_\_\_\_\_, reflecting across the \_\_\_-axis, and shifting vertically \_\_\_ units in the \_\_\_\_\_ direction.

A) 4; right;  $\frac{1}{5}$ ; x; 8; upward

B) 4; left;  $\frac{1}{5}$ ; x; 8; downward

C) 4; left; 8; x;  $\frac{1}{5}$ ; downward

D) 4; right;  $\frac{1}{5}$ ; x; 8; downward

**Write the equation of the graph after the indicated transformation(s).**

15) The graph of  $y = x^2$  is shifted 5 units to the left and 8 units downward.

A)  $y = (x+5)^2 - 8$

B)  $y = (x+8)^2 - 5$

C)  $y = (x-8)^2 + 5$

D)  $y = (x-5)^2 - 8$

**Fill in each blank with the appropriate response.**

16) The graph of  $y = -6x^2$  can be obtained from the graph of  $y = x^2$  by vertically stretching by a factor of \_\_\_ and reflecting across the \_\_\_-axis.

A) -6; y

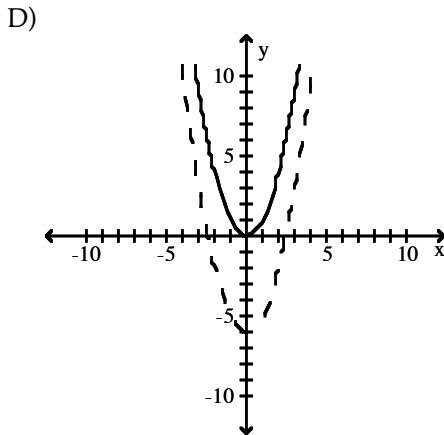
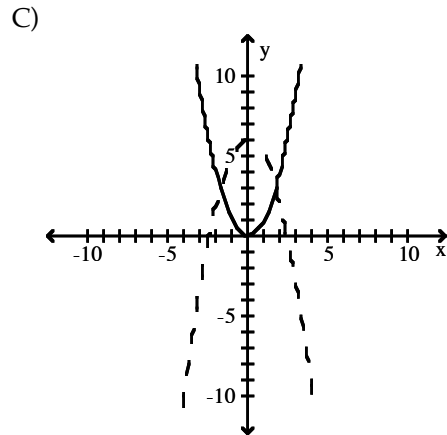
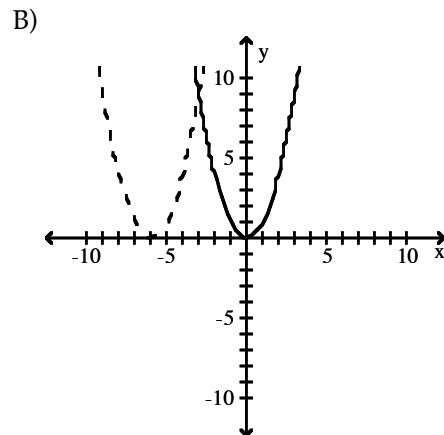
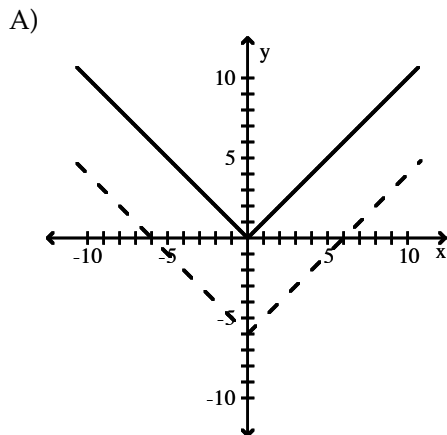
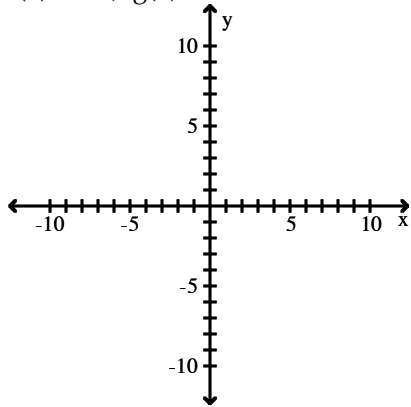
B) 6; y

C) 6; x

D) -6; x

Sketch the graph of the pair of functions. Use a dashed line for  $g(x)$ .

17)  $f(x) = x^2$ ,  $g(x) = x^2 - 6$



Determine whether the function is even, odd, or neither.

18)  $f(x) = 3x^2 - 1$

A) Odd

B) Even

C) Neither

Fill in each blank with the appropriate response.

19) The graph of  $y = -5(x + 4)^2 - 8$  can be obtained from the graph of  $y = x^2$  by shifting horizontally \_\_\_ units to the \_\_\_\_, vertically stretching by a factor of \_\_\_\_, reflecting across the \_\_-axis, and shifting vertically \_\_\_ units in the \_\_\_\_ direction.

A) 4; right; 5; x; 8; upward

B) 4; left; 8; x; 5; downward

C) 4; left; 5; x; 8; downward

D) 4; right; 5; x; 8; downward

**Solve the problem.**

20) The price per unit of a product is \$ $p$  and the number of units of the product is denoted by  $q$ . The demand function for this commodity is given by  $p = \frac{30,000}{q} - 60$ .

Describe the transformations needed to obtain the graph of this function from the graph of  $p = \frac{1}{q}$ .

- A) Shift up 30,000 units and shift 60 units to the right.
- B) Stretch vertically by a factor of 30,000 and shift down 60 units.
- C) Stretch vertically by a factor of 30,000, reflect across the x-axis, and shift down 60 units.
- D) Stretch vertically by a factor of 30,000 and shift 60 units to the right.