

Name _____

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

Add or subtract terms whenever possible.

- 1) $\sqrt{5x} - 6\sqrt{20x} + 3\sqrt{180x}$ 1) _____
 A) $-3\sqrt{5x}$ B) $-3\sqrt{205x}$ C) $7\sqrt{5x}$ D) $7\sqrt{205x}$

Find the product.

- 2) $(p - q)(p^2 + pq + q^2)$ 2) _____
 A) $p^3 - q^3$ B) $p^3 - 2p^2q - 2pq^2 - q^3$
 C) $p^3 + q^3$ D) $p^3 + 2p^2q + 2pq^2 - q^3$

Factor and simplify the algebraic expression.

- 3) $(x + 8)^{-1/5} + (x + 8)^{-6/5}$ 3) _____
 A) $\frac{(x + 9)}{(x + 8)^{1/5}}$ B) $\frac{(x + 9)}{(x + 8)^{6/5}}$
 C) $(x + 8)^{6/5}(x + 9)$ D) $(x + 8)^{-1/5} + (x + 8)^{-6/5}$

Solve the formula for the specified variable.

- 4) $A = P(1 + nr)$ for n 4) _____
 A) $n = \frac{P - A}{Pr}$ B) $n = \frac{A}{r}$ C) $n = \frac{A - P}{Pr}$ D) $n = \frac{Pr}{A - P}$

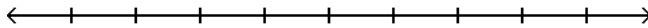
Solve the problem.

- 5) You inherit \$10,000 with the stipulation that for the first year the money must be invested in two stocks paying 6% and 11% annual interest, respectively. How much should be invested at each rate if the total interest earned for the year is to be \$700? 5) _____
 A) \$2000 invested at 6%; \$8000 invested at 11%
 B) \$7000 invested at 6%; \$3000 invested at 11%
 C) \$9000 invested at 6%; \$1000 invested at 11%
 D) \$8000 invested at 6%; \$2000 invested at 11%

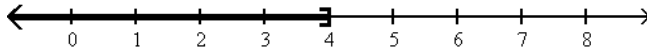
Solve the linear inequality. Other than \emptyset , use interval notation to express the solution set and graph the solution set on a number line.

6) $\frac{x}{8} \leq \frac{x}{2} - \frac{2x - 2}{4}$

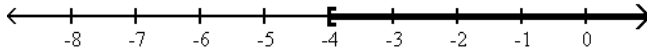
6) _____



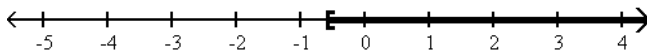
A) $(-\infty, 4]$



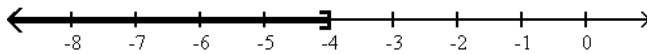
B) $[-4, \infty)$



C) $\left[-\frac{4}{7}, \infty\right)$



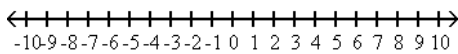
D) $(-\infty, -4]$



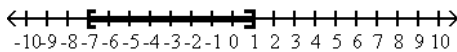
Solve the absolute value inequality. Other than \emptyset , use interval notation to express the solution set and graph the solution set on a number line.

7) $|3(x + 1) + 6| \leq 12$

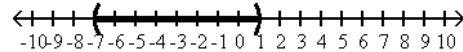
7) _____



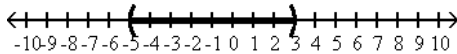
A) $[-7, 1]$



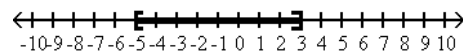
B) $(-7, 1)$



C) $(-5, 3)$



D) $[-5, 3]$



Evaluate the function at the given value of the independent variable and simplify.

8) $f(x) = x^2 + 3$; $f(x + 4)$

8) _____

A) $x^2 + 7$

B) $x^2 + 16$

C) $x^2 + 8x + 16$

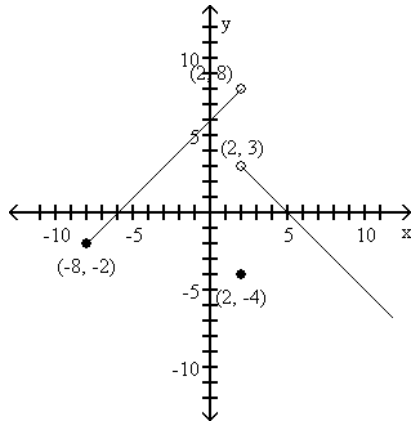
D) $x^2 + 8x + 19$

Graph the function.

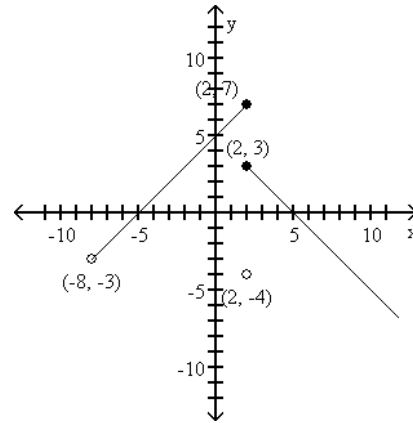
$$9) f(x) = \begin{cases} x + 5 & \text{if } -8 \leq x < 2 \\ -4 & \text{if } x = 2 \\ -x + 5 & \text{if } x > 2 \end{cases}$$

9) _____

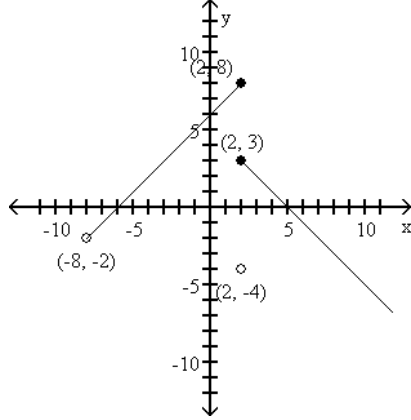
A)



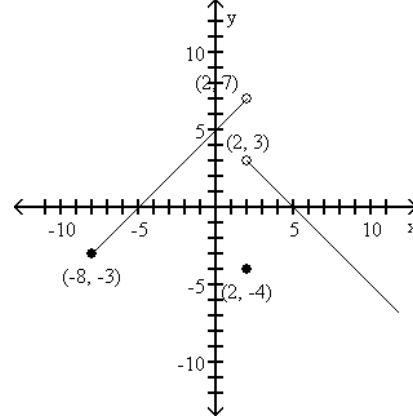
B)



C)



D)



Use the given conditions to write an equation for the line in the indicated form.

10) Passing through (4, 2) and perpendicular to the line whose equation is $y = 4x + 7$;
point-slope form

10) _____

A) $y - 4 = \frac{1}{4}(x - 2)$

B) $y - 2 = \frac{1}{4}(x + 4)$

C) $y - 2 = -\frac{1}{4}(x - 4)$

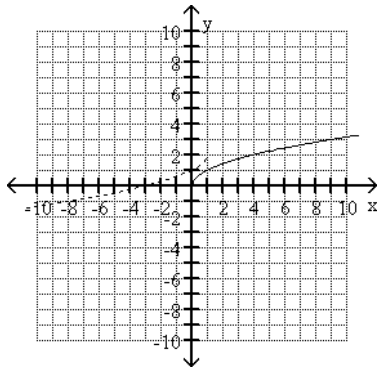
D) $y = -4x - 12$

Begin by graphing the standard square root function $f(x) = \sqrt{x}$. Then use transformations of this graph to graph the given function.

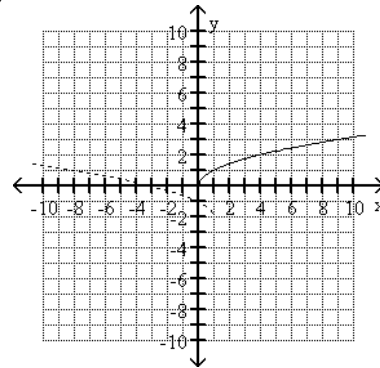
11) $h(x) = \sqrt{-x + 1} + 2$

11) _____

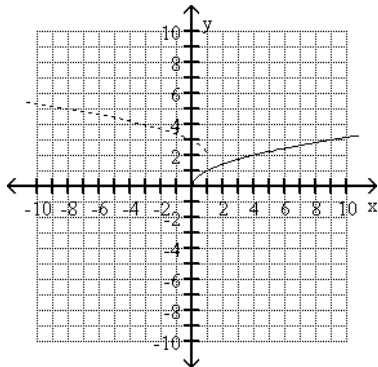
A)



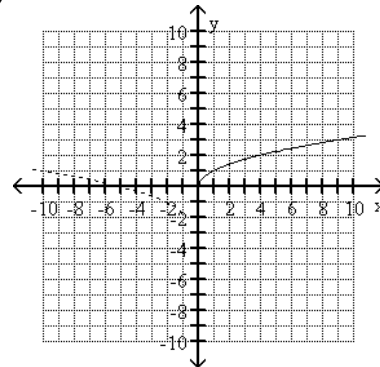
B)



C)



D)



Find the domain of the composite function $f \circ g$.

12) $f(x) = \sqrt{x}$; $g(x) = 5x + 25$

- A) $(-\infty, \infty)$
- C) $[0, \infty)$

- B) $(-\infty, -5]$ or $[0, \infty)$
- D) $[-5, \infty)$

12) _____

Find the inverse of the one-to-one function.

13) $f(x) = \sqrt[3]{x - 6}$

- A) $f^{-1}(x) = x^3 + 6$
- B) $f^{-1}(x) = x^3 + 36$
- C) $f^{-1}(x) = x + 6$
- D) $f^{-1}(x) = \frac{1}{x^3 + 6}$

13) _____

Solve the problem.

14) On a certain route, an airline carries 6000 passengers per month, each paying \$100. A market survey indicates that for each \$1 decrease in the ticket price, the airline will gain 40 passengers.

14) _____

- a. Express the number of passengers per month, N , as a function of the ticket price, x .
- b. Express the monthly revenue for the route, R , as a function of the ticket price, x .

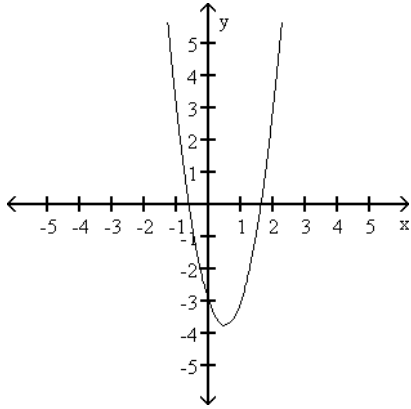
- A) a. $N(x) = 40x + 2000$
- B) a. $N(x) = 40x + 10,000$
- b. $R(x) = 40x^2 + 2000x$
- b. $R(x) = 40x^2 + 10,000x$
- C) a. $N(x) = -40x + 10,000$
- D) a. $N(x) = -40x + 2000$
- b. $R(x) = -40x^2 + 10,000x$
- b. $R(x) = -40x^2 + 2000x$

Use the Leading Coefficient Test to determine the end behavior of the polynomial function. Then use this end behavior to match the function with its graph.

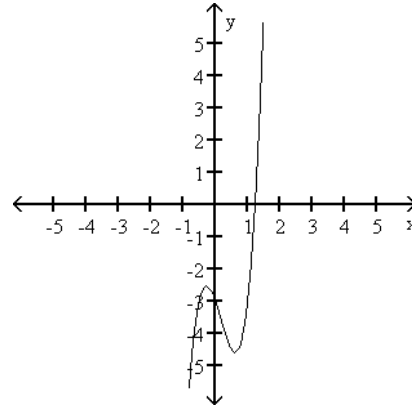
15) $f(x) = 6x^3 - 3x^2 - 3x - 3$

15) _____

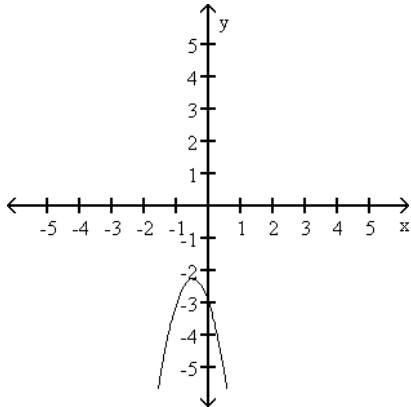
A) rises to the left and rises to the right



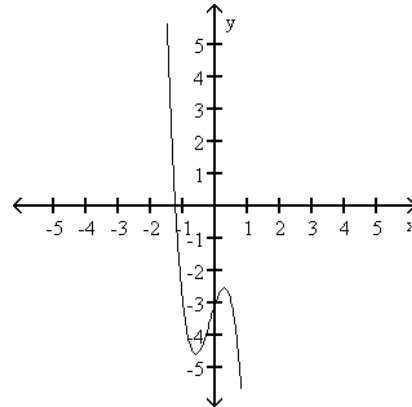
B) falls to the left and rises to the right



C) falls to the left and falls to the right



D) rises to the left and falls to the right



Solve the problem.

16) Solve the equation $3x^3 - 28x^2 + 69x - 20 = 0$ given that 5 is a zero of $f(x) = 3x^3 - 28x^2 + 69x - 20$.

16) _____

A) $\left\{5, -1, -\frac{4}{3}\right\}$

B) $\left\{5, 4, \frac{1}{3}\right\}$

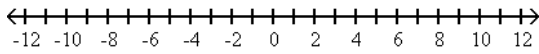
C) $\left\{5, 1, \frac{4}{3}\right\}$

D) $\left\{5, -4, -\frac{1}{3}\right\}$

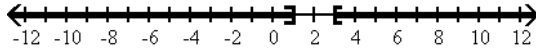
Solve the rational inequality and graph the solution set on a real number line. Express the solution set in interval notation.

17) $\frac{(x - 1)(3 - x)}{(x - 2)^2} \leq 0$

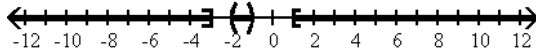
17) _____



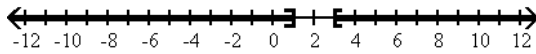
A) $(-\infty, 1] \cup [3, \infty)$



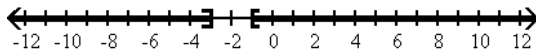
B) $(-\infty, -3] \cup (-2, -1) \cup [1, \infty)$



C) $(-\infty, 1) \cup (3, \infty)$



D) $(-\infty, -3) \cup (-1, \infty)$



Solve the problem.

18) The total profit function $P(x)$ for a company producing x thousand units is given by

18) _____

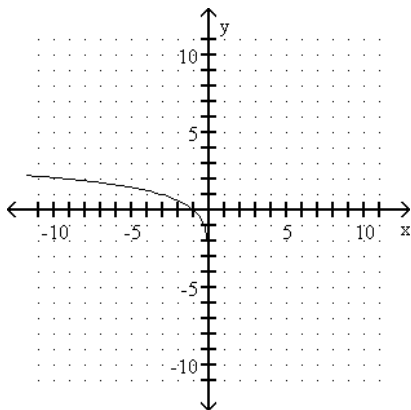
$P(x) = -2x^2 + 22x - 48$. Find the values of x for which the company makes a profit. [Hint: The company makes a profit when $P(x) > 0$.]

- A) x is greater than 3 thousand units
- B) x is less than 8 thousand units
- C) x is between 3 thousand units and 8 thousand units
- D) x is less than 3 thousand units or greater than 8 thousand units

The graph of a logarithmic function is given. Select the function for the graph from the options.

19)

19) _____



- A) $f(x) = \log_3 x$
- B) $f(x) = -\log_3 x$
- C) $f(x) = 1 - \log_3 x$
- D) $f(x) = \log_3 (-x)$

Use properties of logarithms to expand the logarithmic expression as much as possible. Where possible, evaluate logarithmic expressions without using a calculator.

20) $\log_b(yz^4)$ 20) _____

A) $\log_b y + \log_b 4z$

B) $4 \log_b y + 4 \log_b z$

C) $\log_b y + 4 \log_b z$

D) $4 \log_b yz$

Solve the logarithmic equation. Be sure to reject any value that is not in the domain of the original logarithmic expressions. Give the exact answer.

21) $\log 3x = \log 5 + \log(x - 2)$ 21) _____

A) $\left\{\frac{3}{2}\right\}$

B) $\left\{-\frac{5}{4}\right\}$

C) $\{5\}$

D) $\{-5\}$

The point $P(x, y)$ on the unit circle that corresponds to a real number t is given. Find the value of the indicated trigonometric function at t .

22) $\left(-\frac{\sqrt{65}}{9}, \frac{4}{9}\right)$ Find $\cot t$. 22) _____

A) $\frac{\sqrt{65}}{9}$

B) $-\frac{9}{4}$

C) $\frac{4}{9}$

D) $-\frac{\sqrt{65}}{4}$

$0 \leq t < \frac{\pi}{2}$ and $\sin t$ is given. Use the Pythagorean identity $\sin^2 t + \cos^2 t = 1$ to find $\cos t$.

23) $\sin t = \frac{\sqrt{5}}{3}$ 23) _____

A) $\frac{2}{3}$

B) $\frac{3\sqrt{5}}{5}$

C) $\frac{\sqrt{5}}{2}$

D) $\frac{3}{2}$

Find the exact value of the indicated trigonometric function of θ .

24) $\sin \theta = -\frac{2}{3}$, $\tan \theta > 0$ Find $\sec \theta$. 24) _____

A) $-\frac{\sqrt{5}}{3}$

B) $-\frac{2\sqrt{5}}{5}$

C) $\frac{\sqrt{3}}{2}$

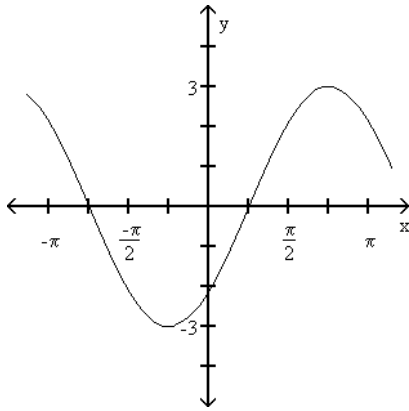
D) $-\frac{3\sqrt{5}}{5}$

Graph the function.

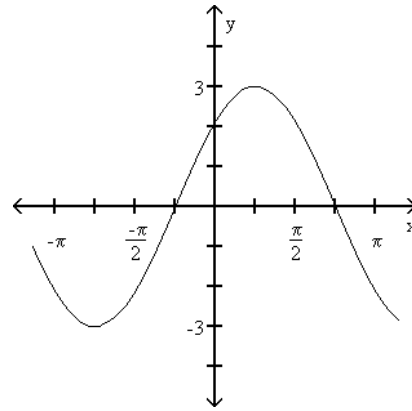
25) $y = 3 \sin\left(x + \frac{\pi}{4}\right)$

25) _____

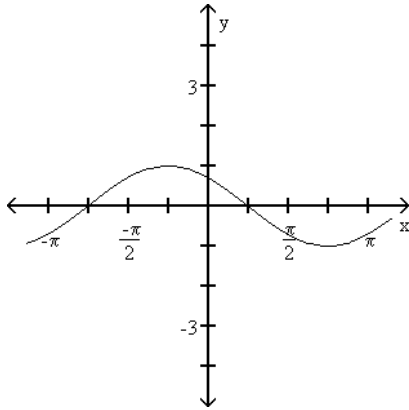
A)



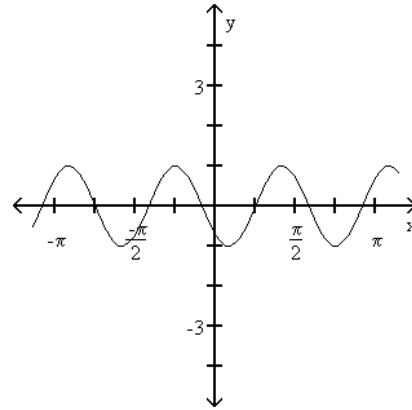
B)



C)



D)



Use a right triangle to write the expression as an algebraic expression. Assume that x is positive and in the domain of the given inverse trigonometric function.

26) $\sin(\sec^{-1} \frac{\sqrt{x^2 + 9}}{x})$

26) _____

A) $\frac{x\sqrt{x^2 + 3}}{x^2 + 3}$

B) $x\sqrt{3}$

C) $\frac{3\sqrt{x^2 + 9}}{x^2 + 9}$

D) $\frac{\sqrt{x^2 + 3}}{x^2 + 3}$

Complete the identity.

27) $\frac{(\sin x + \cos x)^2}{1 + 2 \sin x \cos x} = ?$

27) _____

A) $-\sec^2 x$

B) 1

C) $1 - \sin x$

D) 0

Find all solutions of the equation.

28) $2 \sin x - \sqrt{3} = 0$

28) _____

A) $x = \frac{\pi}{3} + n\pi$ or $x = \frac{2\pi}{3} + n\pi$

B) $x = \frac{\pi}{3} + 2n\pi$ or $x = \frac{2\pi}{3} + 2n\pi$

C) $x = \frac{\pi}{6} + n\pi$ or $x = \frac{5\pi}{6} + n\pi$

D) $x = \frac{\pi}{6} + 2n\pi$ or $x = \frac{5\pi}{6} + 2n\pi$