

Name: Last \_\_\_\_\_ First \_\_\_\_\_

**You must show your work and/or provide explanations for your answers for all questions. Otherwise, no credit will be given.**

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

**Find the value for the function.**

1) Find  $f(2)$  when  $f(x) = \frac{x^2 - 8}{x + 3}$ . 1) \_\_\_\_\_

A)  $\frac{12}{5}$

B) 6

C)  $-\frac{4}{5}$

D)  $\frac{4}{5}$

2) Find  $f(x - 1)$  when  $f(x) = 5x^2 - 5x - 4$ . 2) \_\_\_\_\_

A)  $5x^2 - 15x + 6$

B)  $5x^2 - 25x - 4$

C)  $-15x^2 + 5x + 6$

D)  $5x^2 - 15x - 4$

**Find the domain of the function.**

3)  $h(x) = \frac{x - 4}{x^3 - 64x}$  3) \_\_\_\_\_

A)  $\{x \mid x \neq 4\}$

B)  $\{x \mid x \neq -8, 0, 8\}$

C) all real numbers

D)  $\{x \mid x \neq 0\}$

**For the given functions  $f$  and  $g$ , find the requested function and state its domain.**

4)  $f(x) = 5x^3 + 1$ ;  $g(x) = 5x^2 + 3$  4) \_\_\_\_\_

Find  $f \cdot g$ .

A)  $(f \cdot g)(x) = 25x^6 + 15x^3 + 5x^2 + 3$ ; all real numbers

B)  $(f \cdot g)(x) = 5x^3 + 5x^2 + 3$ ; all real numbers

C)  $(f \cdot g)(x) = 25x^5 + 15x^3 + 5x^2 + 3$ ;  $\{x \mid x \neq 0\}$

D)  $(f \cdot g)(x) = 25x^5 + 15x^3 + 5x^2 + 3$ ; all real numbers

**Solve the problem.**

5) The function  $f(t) = -0.13t^2 + 0.53t + 30.1$  models the U.S. population in millions, ages 65 and older, where  $t$  represents years after 1990. The function  $g(t) = 0.51t^2 + 12.36t + 105.2$  models the total yearly cost of Medicare in billions of dollars, where  $t$  represents years after 1990. What does the function  $\frac{g}{f}$  represent? Find  $\frac{g}{f}(5)$ . 5) \_\_\_\_\_

A) Cost per person in thousands of dollars. \$6.09 thousand

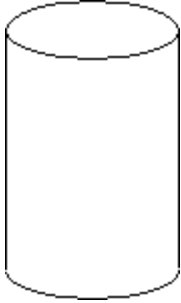
B) Cost per person in thousands of dollars. \$0.20 thousand

C) Cost per person in thousands of dollars. \$12.64 thousand

D) Cost per person in thousands of dollars. \$0.16 thousand

- 6) A steel can in the shape of a right circular cylinder must be designed to hold 500 cubic centimeters of juice (see figure). It can be shown that the total surface area of the can (including the ends) is given by  $S(r) = 2\pi r^2 + \frac{1000}{r}$ , where  $r$  is the radius of the can in centimeters. Using the TABLE

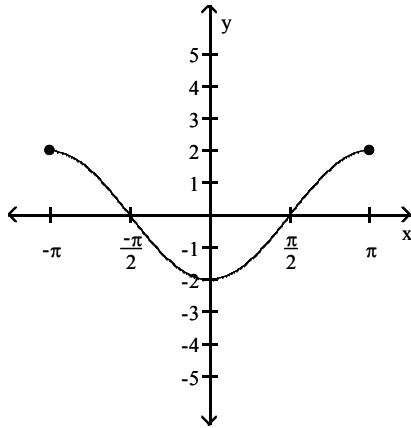
feature of a graphing utility, find the radius that minimizes the surface area (and thus the cost) of the can. Round to the nearest tenth of a centimeter.



- A) 5.5 cm                      B) 0 cm                      C) 4.3 cm                      D) 3.5 cm

The graph of a function is given. Decide whether it is even, odd, or neither.

- 7) \_\_\_\_\_



- A) even                      B) odd                      C) neither

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

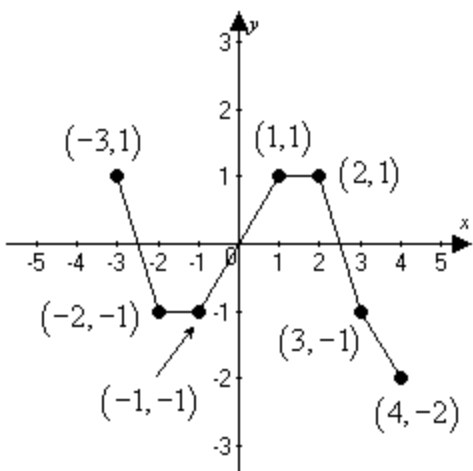
- 8)  $\sqrt[3]{7x^2 + 8}$                       8) \_\_\_\_\_

- A) even                      B) odd                      C) neither

Use the graph to find the intervals on which it is increasing, decreasing, or constant.

9)

9) \_\_\_\_\_



- A) Decreasing on  $(-3, -2)$  and  $(2, 4)$ ; increasing on  $(-1, 1)$ ; constant on  $(-2, -1)$  and  $(1, 2)$
- B) Increasing on  $(-3, -2)$  and  $(2, 4)$ ; decreasing on  $(-1, 1)$ ; constant on  $(-2, -1)$  and  $(1, 2)$
- C) Decreasing on  $(-3, -1)$  and  $(1, 4)$ ; increasing on  $(-2, 1)$
- D) Decreasing on  $(-3, -2)$  and  $(2, 4)$ ; increasing on  $(-1, 1)$

Use a graphing utility to graph the function over the indicated interval and approximate any local maxima and local minima. If necessary, round answers to two decimal places.

10)  $f(x) = x^3 - 12x + 2$ ;  $(-5, 5)$

10) \_\_\_\_\_

- A) local maximum at  $(-2, 18)$   
local minimum at  $(2, -14)$
- B) local minimum at  $(0, 0)$
- C) local maximum at  $(-2, 18)$   
local minimum at  $(0, 0)$   
local minimum at  $(2, -14)$
- D) none

Find the average rate of change for the function between the given values.

11)  $f(x) = \frac{3}{x+2}$ ; from 1 to 4

11) \_\_\_\_\_

- A) -28
- B)  $-\frac{1}{6}$
- C) -2
- D)  $\frac{1}{2}$

Solve the problem.

12) A deep sea diving bell is being lowered at a constant rate. After 10 minutes, the bell is at a depth of 300 ft. After 35 minutes the bell is at a depth of 1400 ft. What is the average rate of lowering per minute? Round to the nearest hundredth is needed.

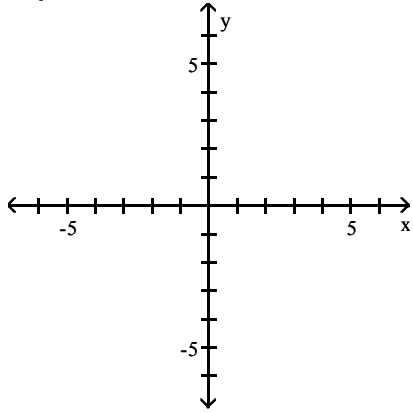
12) \_\_\_\_\_

- A) 31.4 ft per minute
- B) 0.02 ft per minute
- C) 40.0 ft per minute
- D) 44.0 ft per minute

Graph the function.

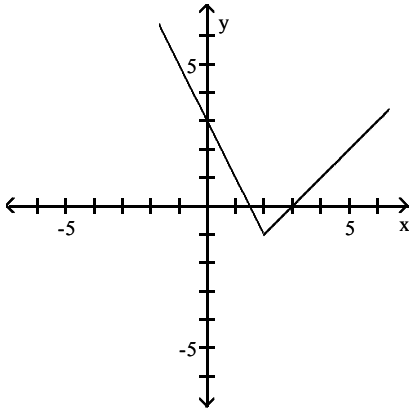
13)

$$f(x) = \begin{cases} -x + 3 & \text{if } x < 2 \\ 2x - 3 & \text{if } x \geq 2 \end{cases}$$

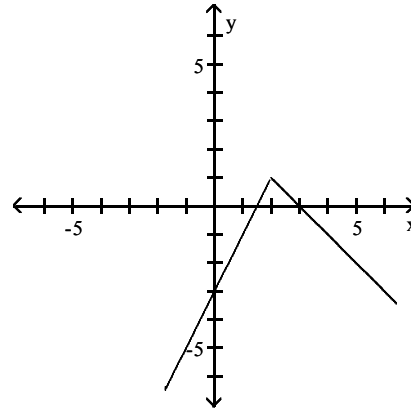


13) \_\_\_\_\_

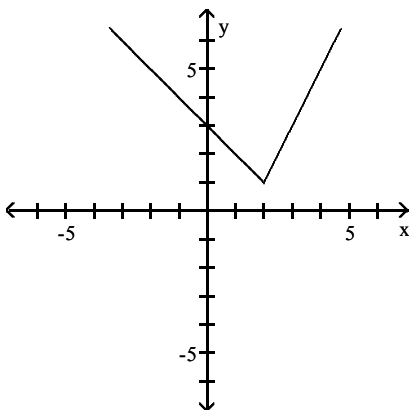
A)



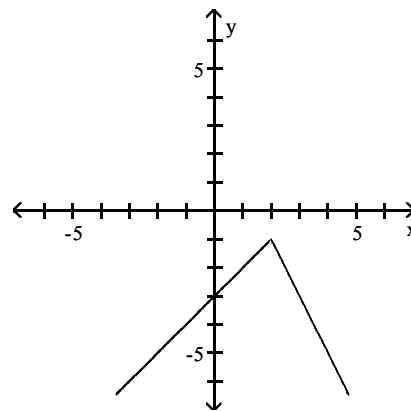
B)



C)



D)



Write an equation that results in the indicated translation.

14) The square root function, shifted 7 units to the left

A)  $y = \sqrt{x + 7}$

B)  $y = \sqrt{x - 7}$

C)  $y = \sqrt{x} - 7$

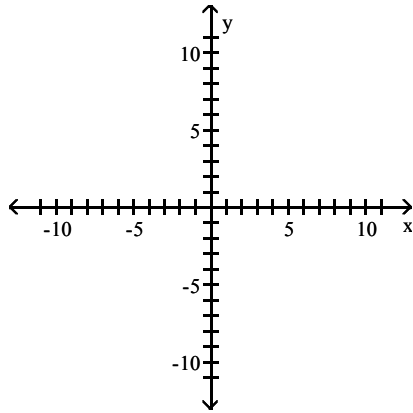
D)  $y = \sqrt{x + 7}$

14) \_\_\_\_\_

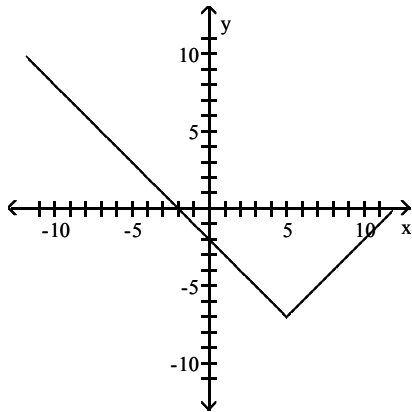
Graph the function by starting with the graph of the basic function and then using the techniques of shifting, compressing, stretching, and/or reflecting.

15)  $f(x) = |x + 5| - 7$

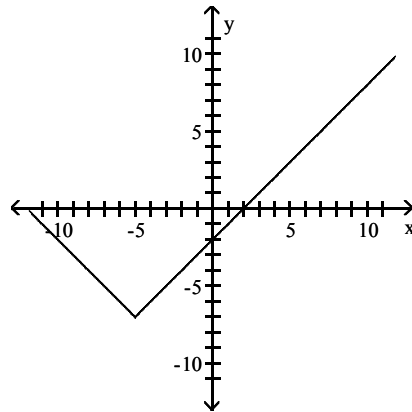
15) \_\_\_\_\_



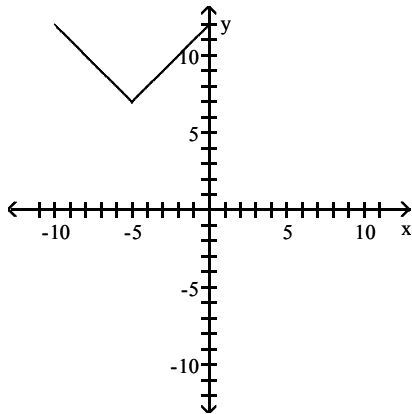
A)



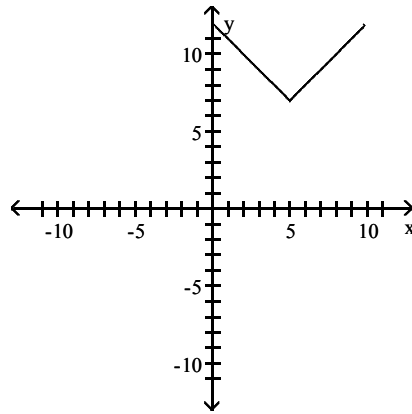
B)



C)



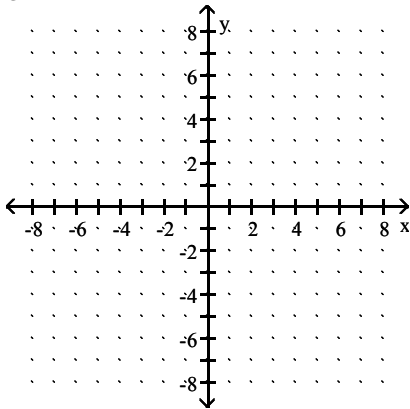
D)



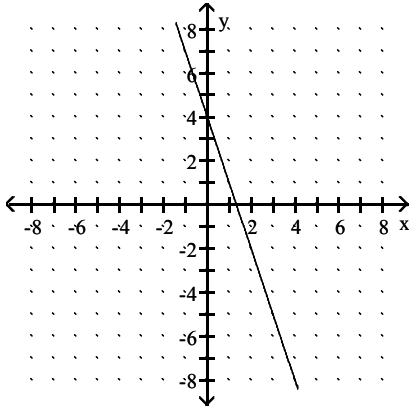
Graph the function. State whether it is increasing, decreasing, or constant..

16)  $g(x) = 3x - 4$

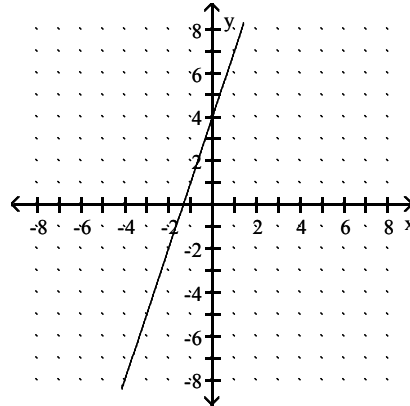
16) \_\_\_\_\_



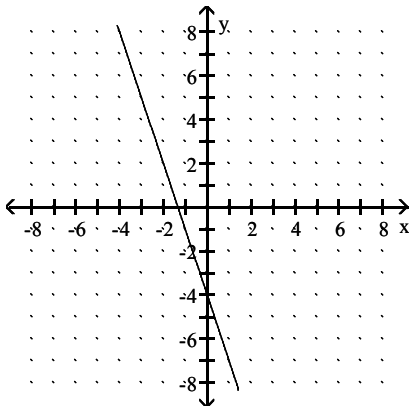
A) decreasing



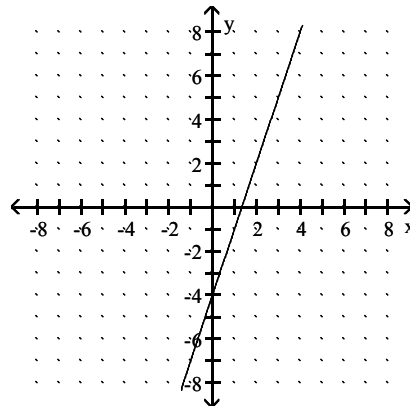
B) increasing



C) decreasing



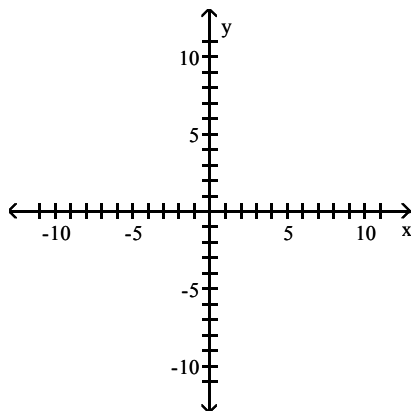
D) increasing



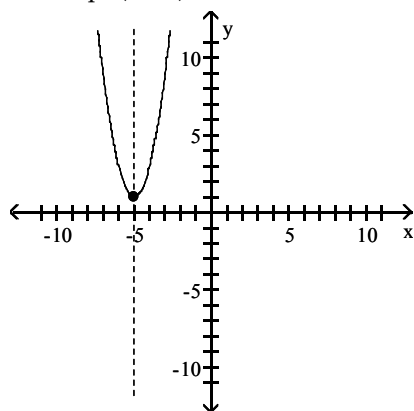
Graph the function using its vertex, axis of symmetry, and intercepts.

17)  $f(x) = 2x^2 + 20x + 51$

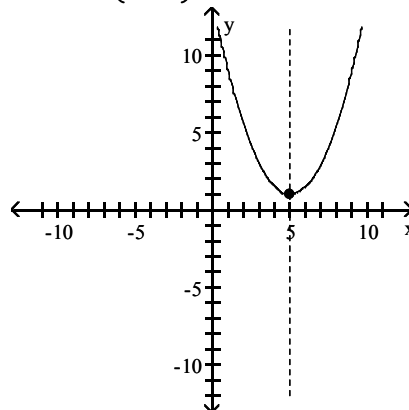
17) \_\_\_\_\_



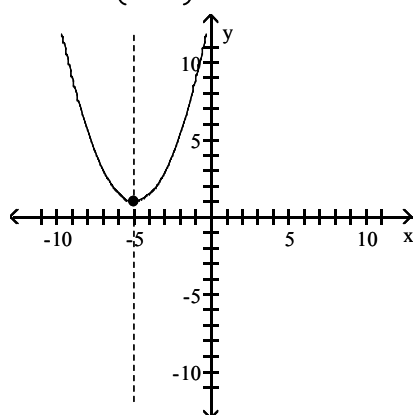
A) vertex  $(-5, 1)$   
intercept  $(0, 51)$



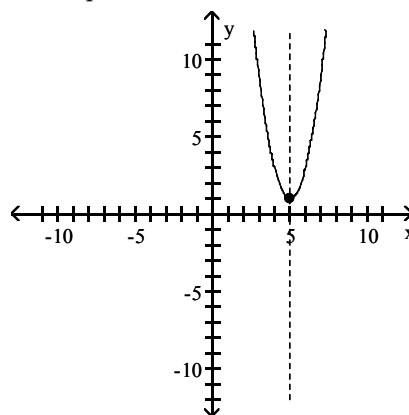
B) vertex  $(5, 1)$   
intercept  $(0, \frac{27}{2})$



C) vertex  $(-5, 1)$   
intercept  $(0, \frac{27}{2})$



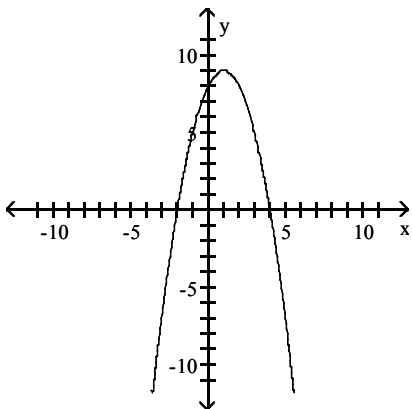
D) vertex  $(5, 1)$   
intercept  $(0, 51)$



Determine the quadratic function whose graph is given.

18)

18) \_\_\_\_\_



Vertex: (1, 9)

y-intercept: (0, 8)

A)  $f(x) = -x^2 - 4x + 8$

B)  $f(x) = x^2 - 4x + 8$

C)  $f(x) = -x^2 + 2x - 8$

D)  $f(x) = -x^2 + 2x + 8$

Solve the problem.

19) The manufacturer of a CD player has found that the revenue  $R$  (in dollars) is

19) \_\_\_\_\_

$R(p) = -5p^2 + 1120p$ , when the unit price is  $p$  dollars. If the manufacturer sets the price  $p$  to maximize revenue, what is the maximum revenue to the nearest whole dollar?

A) \$501,760

B) \$62,720

C) \$250,880

D) \$125,440

20) A developer wants to enclose a rectangular grassy lot that borders a city street for parking. If the developer has 240 feet of fencing and does not fence the side along the street, what is the largest area that can be enclosed?

20) \_\_\_\_\_

A) 3600 ft<sup>2</sup>

B) 7200 ft<sup>2</sup>

C) 14,400 ft<sup>2</sup>

D) 10,800 ft<sup>2</sup>

## Answer Key

Testname: MATH1111-Q3-PRACTICE

- 1) C
- 2) A
- 3) B
- 4) D
- 5) A
- 6) C
- 7) A
- 8) A
- 9) A
- 10) A
- 11) B
- 12) D
- 13) C
- 14) D
- 15) B
- 16) D
- 17) A
- 18) D
- 19) B
- 20) B