

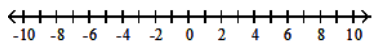
Name _____

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

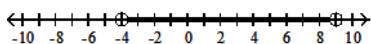
Draw the interval on a number line.

1) $(-4, 9]$

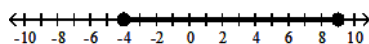
1) _____



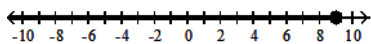
A)



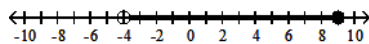
B)



C)

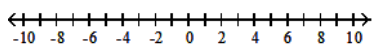


D)

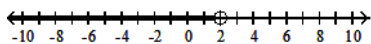


2) $[-2, 2)$

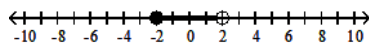
2) _____



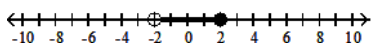
A)



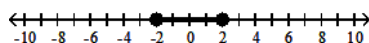
B)



C)

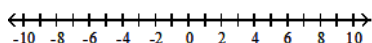


D)

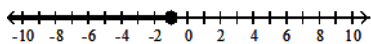


3) $[-1, \infty)$

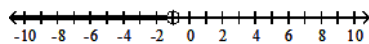
3) _____



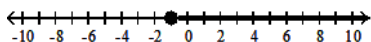
A)



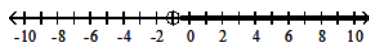
B)



C)

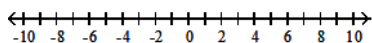


D)

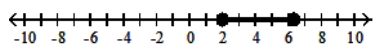


4) $[2, 2\pi)$

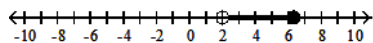
4) _____



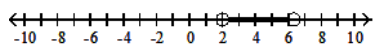
A)



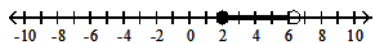
C)



B)

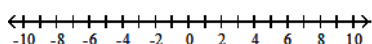


D)

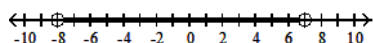


5) $(-\sqrt{8}, 7)$

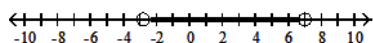
5) _____



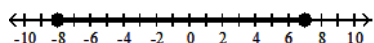
A)



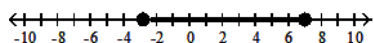
C)



B)



D)



6) Use intervals to describe the real numbers satisfying the inequality, $x < 9$, $x \geq -2$.

6) _____

A) $(-2, 9]$

B) $[-9, 2)$

C) $(-2, 9)$

D) $[-2, 9)$

E) none of these

7) Use intervals to describe the real numbers satisfying the inequality, $x \geq \sqrt{7}$.

7) _____

A) $(-\infty, \sqrt{7})$

B) $(\sqrt{7}, \infty)$

C) $(-\infty, \sqrt{7}]$

D) $(\sqrt{7}, \infty)$

E) none of these

Use intervals to describe the real numbers satisfying the inequality.

8) $x \leq -7$

8) _____

A) $[-7, \infty)$

B) $(-\infty, -7)$

C) $(-\infty, -7]$

D) $[-\infty, -7]$

9) $-1 < x < 4$

9) _____

A) $(-1, 4]$

B) $[-1, 4)$

C) $(-1, 4)$

D) $[-1, 4]$

10) $1 \leq x \leq 8$

10) _____

A) $[1, 8)$

B) $(1, 8)$

C) $(1, 8]$

D) $[1, 8]$

Evaluate the function.

11) $f(x) = x^2 - 4x - 7$; Find $f(0)$.

A) 49

B) -7

C) 0

D) 7

11) _____

12) $f(x) = 2x^2 - 2x - 7$; Find $f(-2)$.

A) 19

B) 1

C) -3

D) 5

12) _____

13) $f(x) = \frac{3x}{4x+1}$; Find $f(-3)$.

A) $\frac{9}{11}$

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

C) -9

D) $\frac{3}{4}$

13) _____

14) $f(x) = 2x^2 - 2x + 2$; Find $f(t-1)$.

A) $2t^2 + 2t + 2$

B) $2t^2 - 6t + 2$

C) $2t^2 - 6t + 6$

D) $-6t^2 + 2t + 6$

14) _____

Evaluate the function for the given value.

15) $f(x) = \begin{cases} \frac{x-7}{2x+1} & \text{if } x \neq -\frac{1}{2} \\ 7 & \text{if } x = -\frac{1}{2} \end{cases}$; $f\left(-\frac{1}{2}\right)$

A) $-\frac{7}{2}$

B) 7

C) $-\frac{15}{2}$

D) 0

15) _____

16) $f(x) = \begin{cases} \frac{x-5}{2x+4} & \text{if } x \neq -2 \\ 14 & \text{if } x = -2 \end{cases}$; $f(5)$

A) 0

B) $\frac{1}{14}$

C) 70

D) 14

16) _____

17) If $f(x) = \sqrt{1 + \sqrt{x}}$, find $f(9)$.

A) 3

B) $\sqrt{10}$

C) $\sqrt{3}$

D) 2

E) none of these

17) _____

18) If $f(x) = \frac{2x}{x^2+1}$, find $f(-2)$.

A) 0

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

C) $\frac{4}{3}$

D) -2

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

18) _____

19) For $f(x) = -x^2 + 3x + 1$ compute $f(x + 1)$.

19) _____

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

B) $-x^2 + 3x + 5$

C) $-x^2 + x + 3$

D) $-x^2 + 3x + 3$

E) none of these

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

20) Let $f(x) = \frac{x + 4}{x^2 + 4x + 4}$. Find $f(1) = a$, $f(-1) = b$, $f(2) = c$.

20) _____

Enter your answer exactly as :

$f(1)=a, f(-1)=b, f(2)=c$

using reduced fractions or integers for a,b, and c.

21) Let $g(x) = \sqrt{\frac{1}{25 - x^2}}$. Find $g(-4)$.

21) _____

Enter your answer exactly in the form:

$g(-4)=a/b$

where a and b are integers, and a/b is in lowest terms.

22) If $h(t) = \frac{t^2}{t - 6}$, find $h(a + 2)$.

22) _____

Enter your answer exactly in the form:

$h(a + 2) = \frac{P(a)}{Q(a)}$

Where P and Q are polynomials in standard form.

23) Is the point $\left(\frac{1}{2}, 2\right)$ on the graph of the function $f(x) = (x + 1)^2 - \frac{x}{2}$?

23) _____

Enter your answer as just the word yes or the word no.

24) Compute $f(-2)$, $f(0)$, and $f(3)$ where $f(x) = \begin{cases} x^2 & \text{for } -5 \leq x \leq -1 \\ \frac{1}{x - 2} & \text{for } -1 < x \leq 2 \\ \sqrt{12 - x} & \text{for } 2 < x \end{cases}$

24) _____

Enter your answer exactly in the form:

a,b,c

where $a < b < c$ and are either fractions of the form d/e in lowest terms or integers.

25) If $f(3) = 5 + a$ and $(3, -1)$ is on the graph of f , find a .

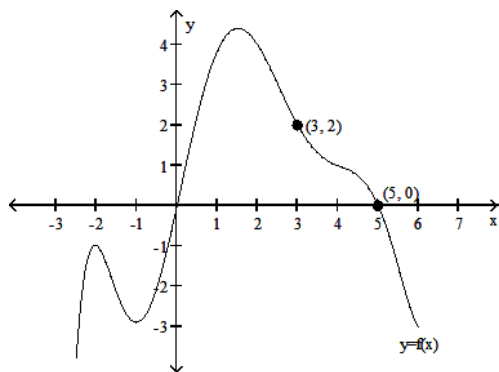
25) _____

Enter your answer as just an integer, no variables.

Use the following graph to solve the problem.

26)

26) _____

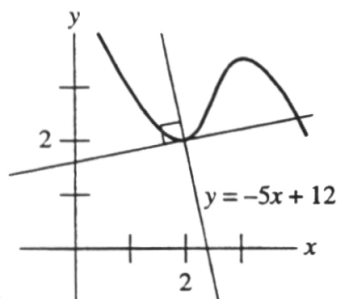


Are all of the following true? Enter your answer exactly as just the word true or the word false.

- (a) $f(3) = 2$
- (b) $f(5) = 0$
- (c) $f(-2)$ is negative
- (d) $f(6)$ is negative
- (e) $f(2)$ is greater than $f(4)$
- (f) $f(x) = 0$ for $x=0,5$
- (g) $f(x) \leq 0$ on $(-\infty, 0] \cup [5, \infty)$

27) Consider the curve $f(x)$ in the accompanying sketch.

27) _____



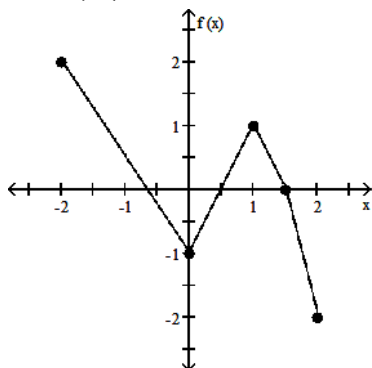
Find $f(2)$. Enter your answer as just an integer.

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

Use the graph to evaluate the function $f(x)$ at the indicated value of x .

28) Find $f(-1)$.

28) _____

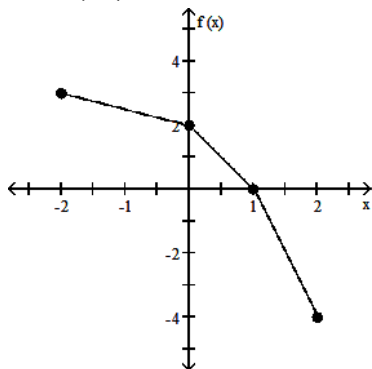


- A) -0.5
- C) 0.5

- B) 0.25
- D) None of these are correct.

29) Find $f(1.5)$.

29) _____



- A) -1
- C) 0.5

- B) -2
- D) None of these are correct.

- 30) If $f(x) = \frac{4x}{8(x+2)(-x-1)}$, which of the following are true? 30) _____
- (I) -1 is the domain
- (II) $f\left(\frac{1}{2}\right) = -\frac{1}{15}$
- (III) $f(0) = -\frac{1}{16}$
- (IV) f is not defined at $x = -2$ and $x = -1$
- A) I and II
- B) II and IV
- C) II and III
- D) I and IV
- E) none of these

- 31) Which of the following pairs of points lie on the line $-x + 3y = 12$? 31) _____
- A) (-12, 0) and (0, 4)
- B) (0, 12) and (2, 6)
- C) (12, 0) and (0, 4)
- D) (1, 3) and (0, 2)

- 32) Describe the domain of the function $f(x) = \frac{1}{(x-1)^2(x-3)}$. 32) _____
- A) $x \neq 1, 3$
- B) $x \neq 1$, and $f(0) = \frac{1}{3}$
- C) $x = 1, 3$
- D) $x \neq -1, -3$, and $f(2) = 1$
- E) none of these

- 33) Describe the domain of the function $f(x) = \frac{1}{\sqrt{1-x}}$. 33) _____
- A) $x \geq 0$
- B) $x < 1$
- C) $x \geq 1$
- D) $x \leq 1$
- E) none of these

State the domain of the given function.

- 34) $f(x) = \frac{x}{x-2}$ 34) _____
- A) All x
- B) $x \neq 2$
- C) $x > 2$
- D) $x = 2$

- 35) $f(x) = \frac{4}{9x-7}$ 35) _____
- A) $x \neq \frac{7}{9}$
- B) $x > \frac{7}{9}$
- C) $x \neq \frac{9}{7}$
- D) All x

- 36) $f(x) = \sqrt{x+6}$ 36) _____
 A) $x \neq -6$ B) $x \geq 6$ C) $x \geq -6$ D) $x > -6$
- 37) $f(x) = \sqrt{-x-7}$ 37) _____
 A) $x \leq -7$ B) $x \geq 7$ C) $x \geq -7$ D) $x \leq 7$
- 38) $f(x) = \frac{3x}{x^2-1}$ 38) _____
 A) All x B) $x \geq 1$ C) $x \neq -1, 1$ D) $x \neq 1$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

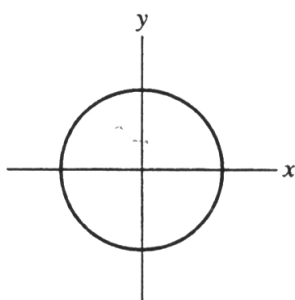
- 39) Describe the domain of $f(x) = \frac{(x+1)(x+2)\sqrt{x-3}}{(x^2+1)(x^2+5)}$. 39) _____
 Enter your answer in standard interval notation.
 No variables.
- 40) Describe the domain of $g(x) = \frac{\sqrt{|2-x|}}{(x+1)(x-3)}$. 40) _____
 Enter your answer in standard interval notation.
 No variables.
- 41) Describe the domain of $f(x) = \sqrt{x} + \sqrt{x+1} + \sqrt{x-1} + \sqrt{x+3} - \sqrt{x-4}$. 41) _____
 Enter your answer in standard interval notation.
 No variables.
- 42) Describe the domain of the function $g(x) = \frac{\sqrt{x+5}}{x+3}$. 42) _____
 Enter your answer in standard interval notation.
 No variables.
- 43) Describe the domain of the function $f(z) = \frac{5z}{(z+3)\sqrt{z-2}}$. 43) _____
 Enter your answer in standard interval notation.
 No variables.

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

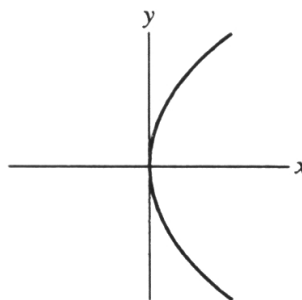
44) Decide which curve is the graph of a function.

44) _____

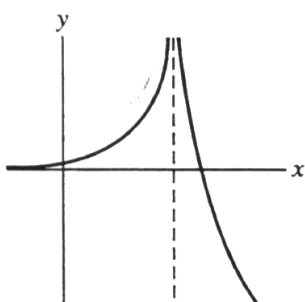
A)



B)



C)

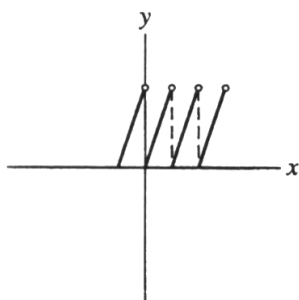


D) none of these

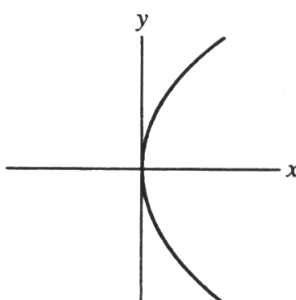
45) Decide which of the curves below are graphs of functions?

45) _____

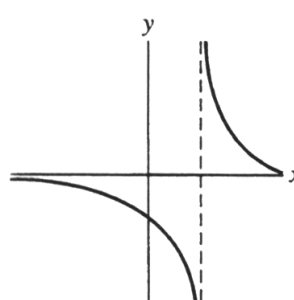
(I)



(II)



(III)



A) I and II only

B) I only

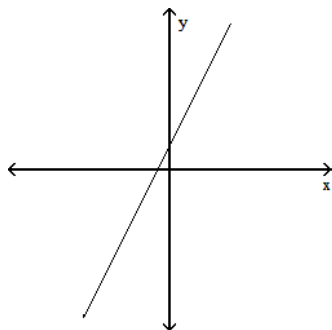
C) I and III only

D) all of these

E) none of these

Decide whether the graph represents a function.

46)

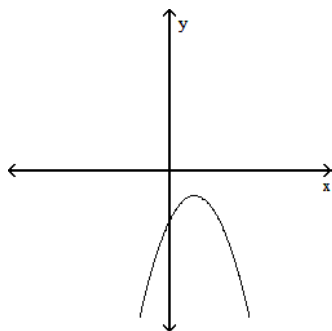


A) Function

B) Not a function

46) _____

47)

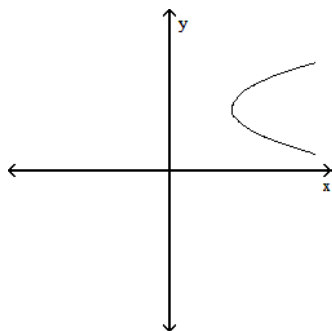


A) Function

B) Not a function

47) _____

48)

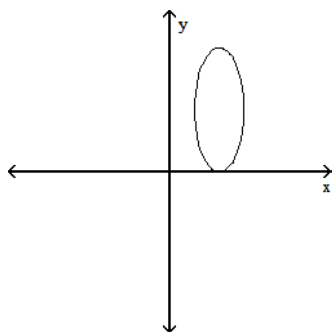


A) Function

B) Not a function

48) _____

49)

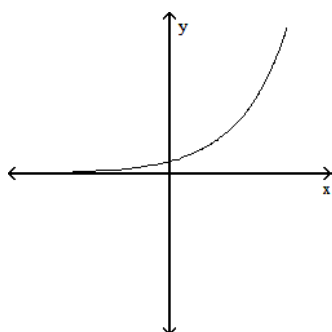


49) _____

A) Function

B) Not a function

50)

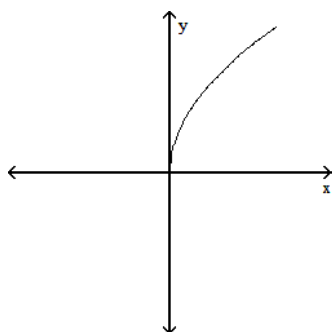


50) _____

A) Function

B) Not a function

51)



51) _____

A) Function

B) Not a function

Solve the problem.

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

52) _____

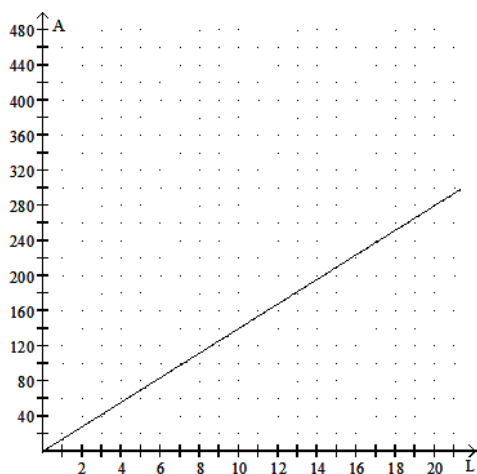
A) \$3.00

B) \$30.00

C) \$15.00

D) \$20.00

- 53) The graph shows the relationship between the area A of a rectangle and the length L , if the width is fixed. Find the area if the length is 14 cm. 53) _____



- A) 168 cm^2 B) 196 cm^2 C) 224 cm^2 D) 154 cm^2
- 54) The height of a baseball that is thrown from ground level with an initial velocity of 69 feet per second can be modeled by $h(t) = -16t^2 + 69t$. Find the height of the ball after 1.6 seconds. 54) _____
- A) 151.36 ft B) 109.96 ft C) 59.2 ft D) 69.44 ft
- 55) The price Luke charges for shipping items from his home business is based on the total order amount. For orders up to \$275 he charges 5% of the total amount. For orders over \$275 he charges 4% of the total plus \$13.75. If x is the amount of the sale (in dollars), express the shipping charge as a function of x . 55) _____

A) $f(x) = \begin{cases} 0.04x + 13.75 & \text{for } 0 \leq x \leq 275 \\ 0.05x & \text{for } 275 < x \end{cases}$

C) $f(x) = \begin{cases} 5x & \text{for } 0 \leq x \leq 275 \\ 4x + 13.75 & \text{for } 275 < x \end{cases}$

B) $f(x) = \begin{cases} 0.05x & \text{for } 0 \leq x \leq 275 \\ 0.04x + 13.75 & \text{for } 275 < x \end{cases}$

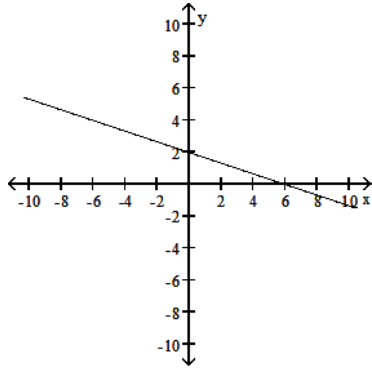
D) $f(x) = \begin{cases} 0.05x & \text{for } 0 \leq x \leq 275 \\ 13.75 & \text{for } 275 < x \end{cases}$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

56) Is this the graph of the function $y = -\frac{1}{3}x + 2$?

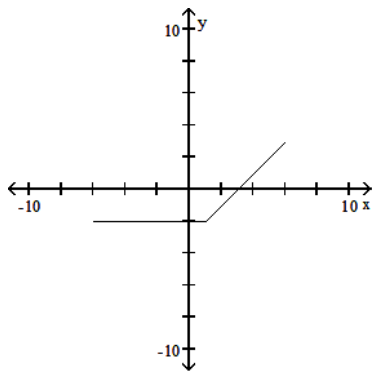
56) _____

Enter your answer as just the word yes or the word no.



57) Is the following the graph of $f(x) = \begin{cases} -2 & -6 \leq x \leq 1 \\ x - 3 & 1 < x \leq 6 \end{cases}$?

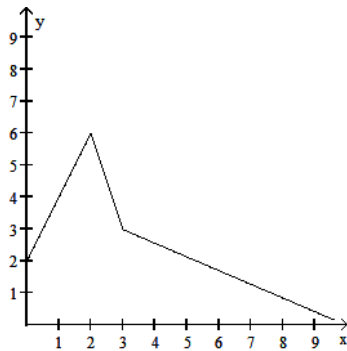
57) _____



58) Is this the graph of the function $f(x) = \begin{cases} 2x + 6 & \text{for } 0 \leq x < 2 \\ 3x & \text{for } 2 \leq x \leq 3 \\ \frac{30}{7} - \frac{3}{7}x & \text{for } x > 3 \end{cases}$?

58) _____

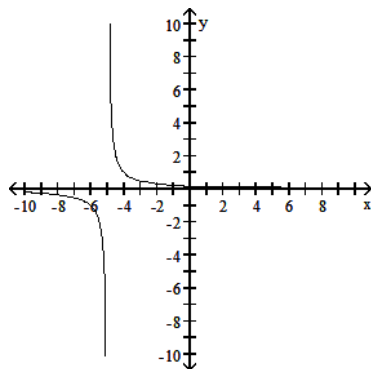
Enter your answer as just the word yes or the word no.



59) Is this the graph of the following function: $f(x) = \frac{1}{x + 5}$?

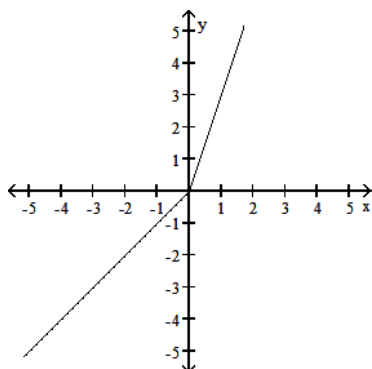
59) _____

Enter your answer as just the word yes or the word no.



60) Is this the graph of the following function: $f(x) = 2x + |x|$?
Enter just the word yes or the word no.

60) _____

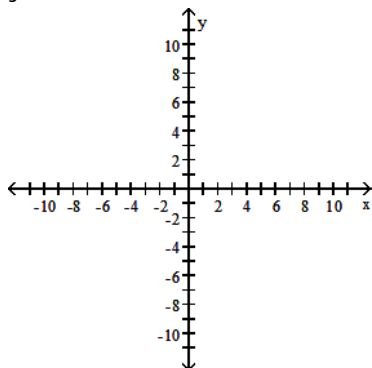


MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

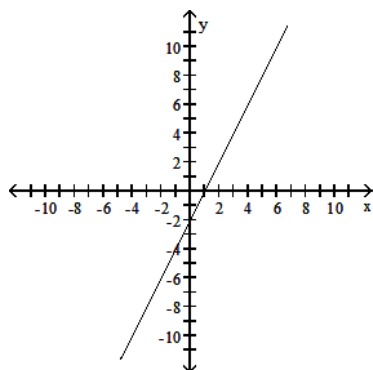
Graph the equation.

61) $y = 2x - 2$

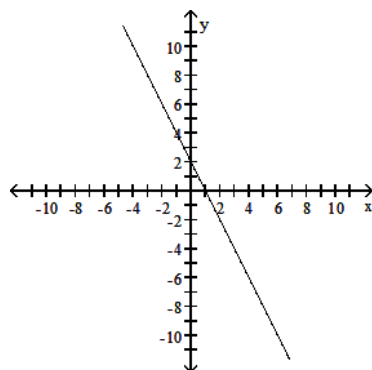
61) _____



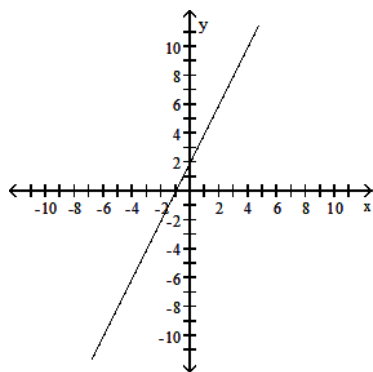
A)



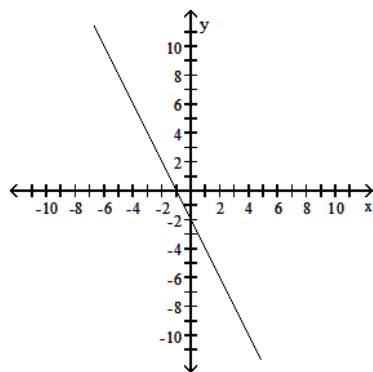
B)



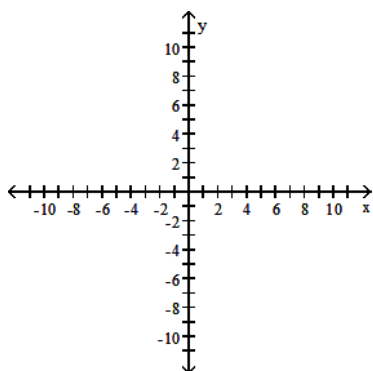
C)



D)

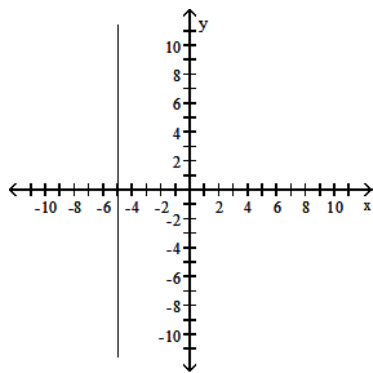


62) $x = 5$

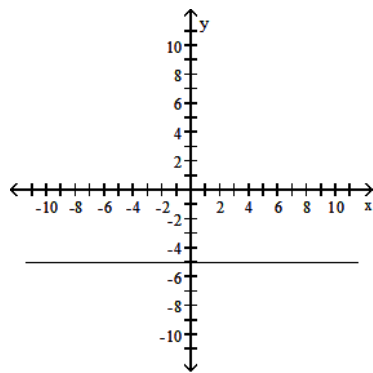


62) _____

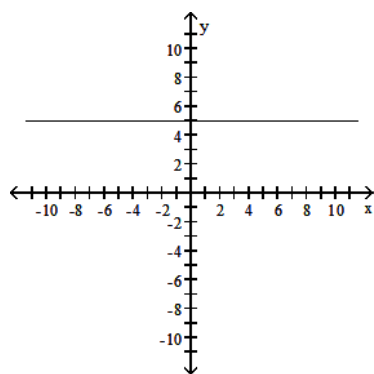
A)



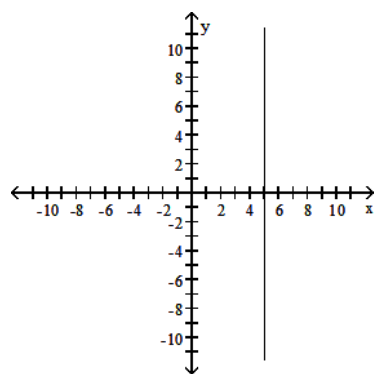
B)



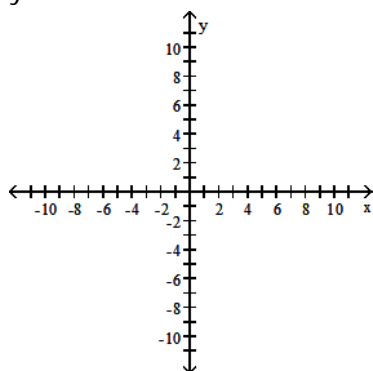
C)



D)

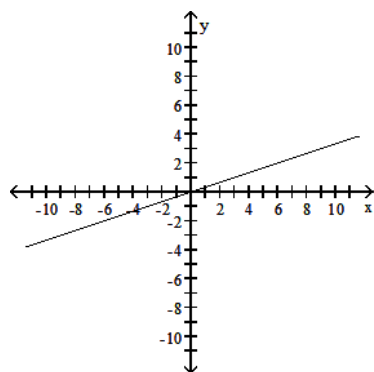


63) $y - 3 = 0$

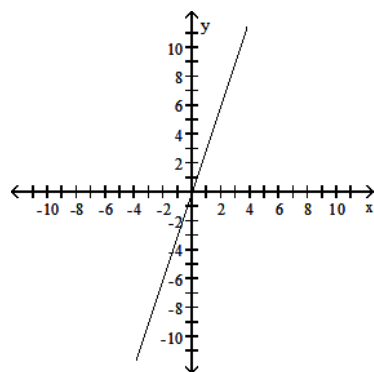


63) _____

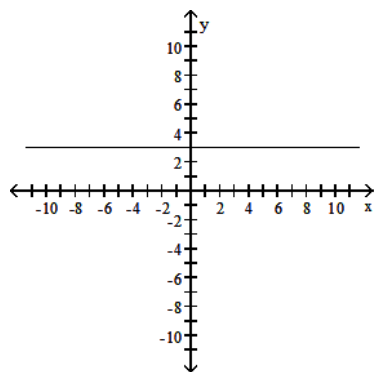
A)



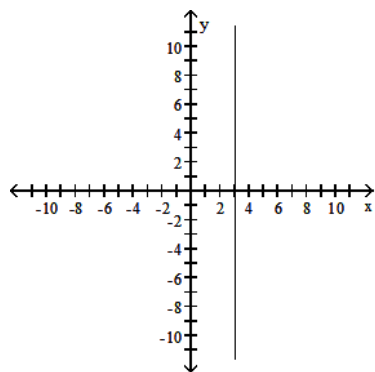
B)



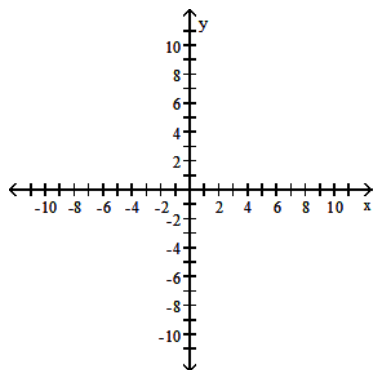
C)



D)

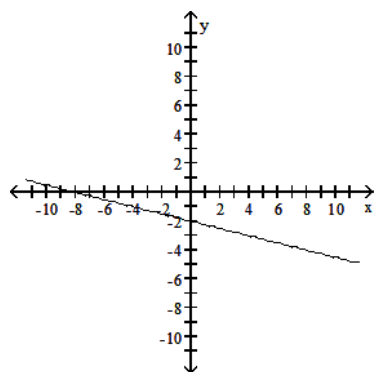


64) $y = -\frac{1}{4}x - 2$

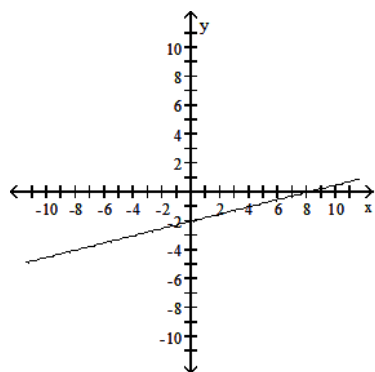


64) _____

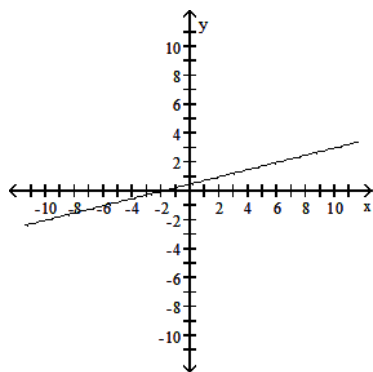
A)



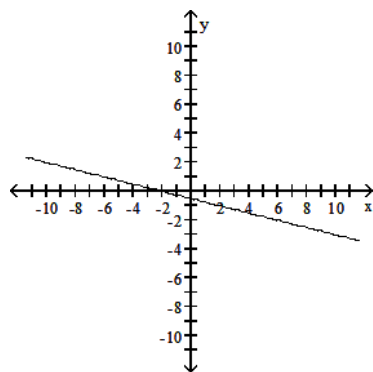
B)



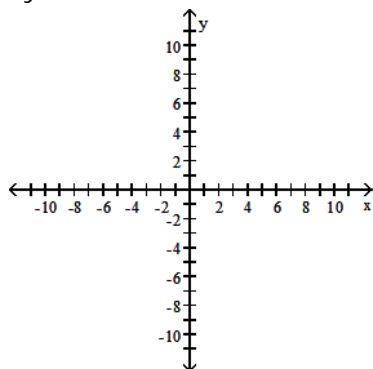
C)



D)

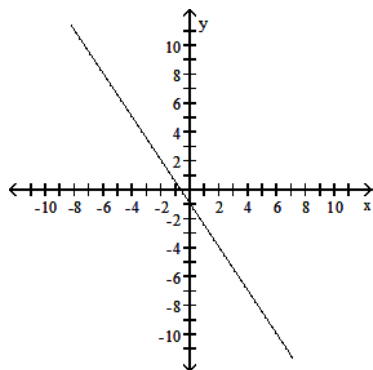


65) $2y + 3x = 2$

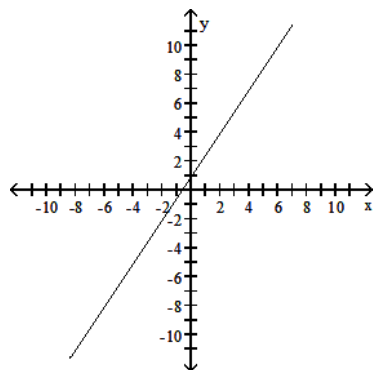


65) _____

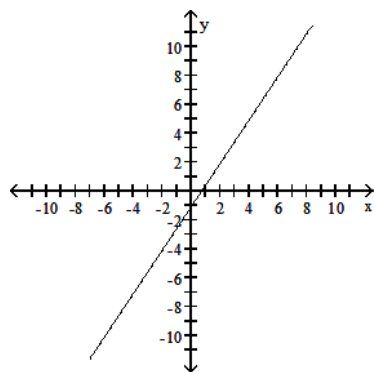
A)



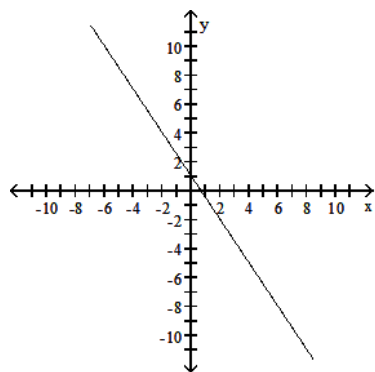
B)



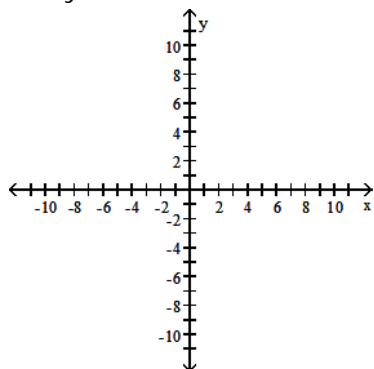
C)



D)

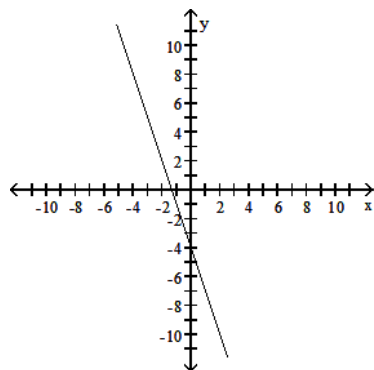


66) $3x + y = -4$

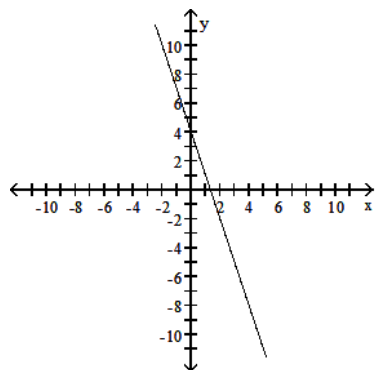


66) _____

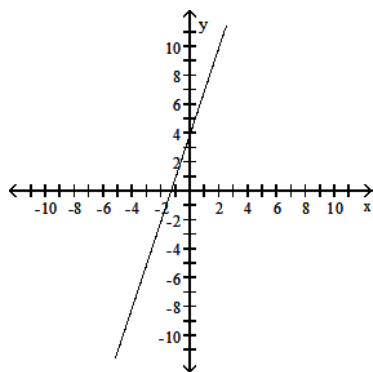
A)



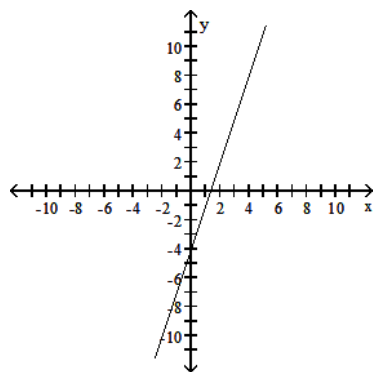
B)



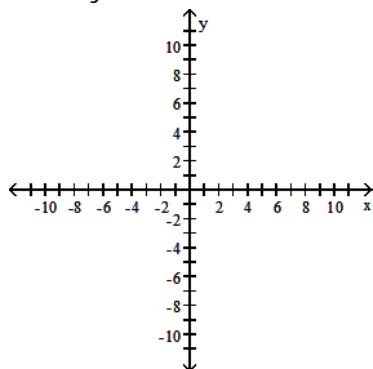
C)



D)

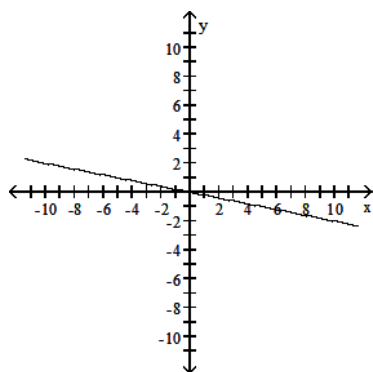


67) $3x - 15y = 0$

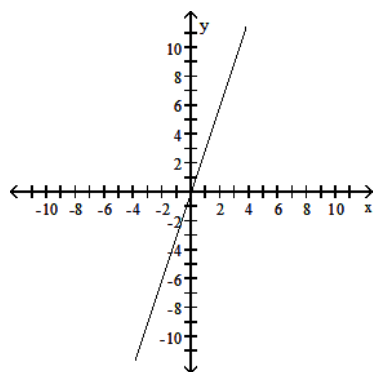


67) _____

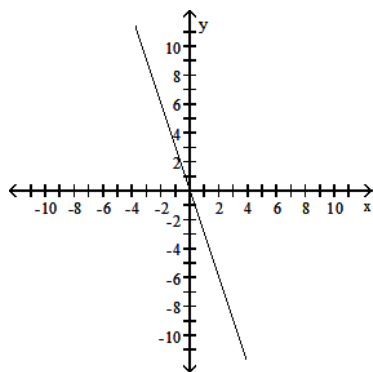
A)



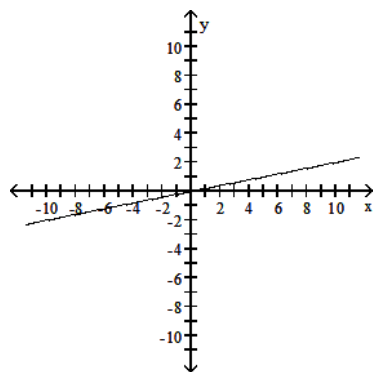
B)



C)



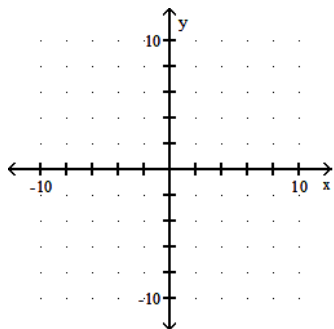
D)



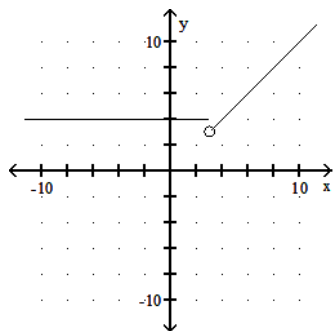
Graph the function.

$$68) f(x) = \begin{cases} 4, & \text{for } x \leq 3, \\ x+1, & \text{for } x > 3 \end{cases}$$

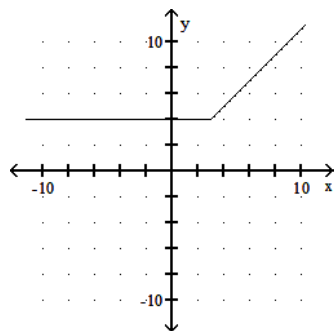
68) _____



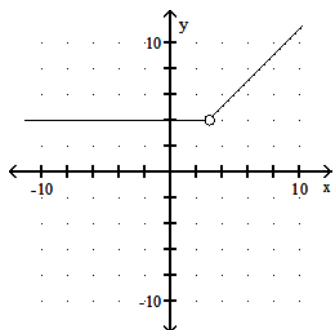
A)



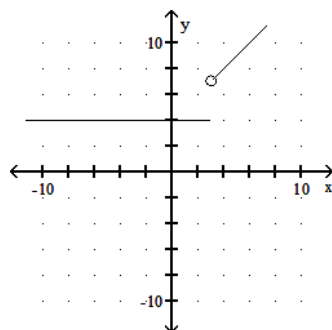
B)



C)

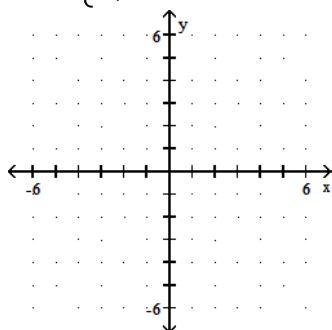


D)

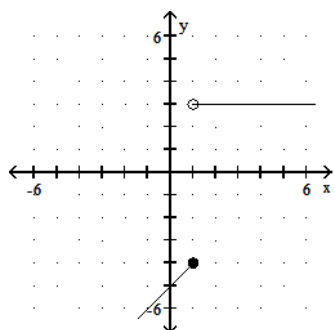


69) $f(x) = \begin{cases} x - 5, & \text{for } x < 1, \\ 3, & \text{for } x \geq 1 \end{cases}$

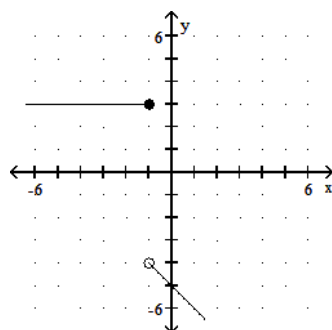
69) _____



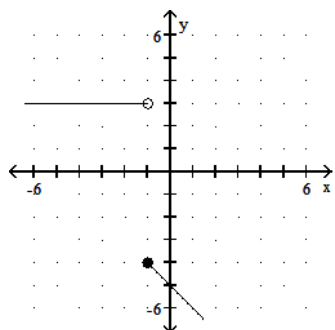
A)



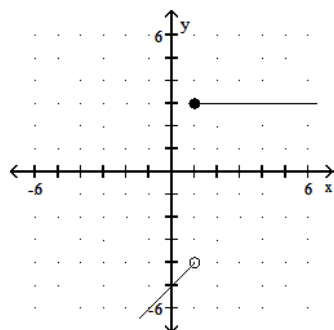
B)



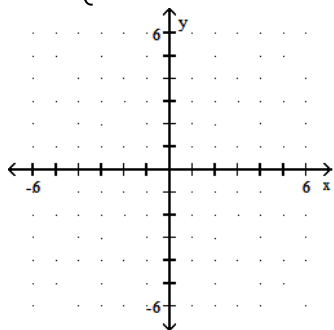
C)



D)

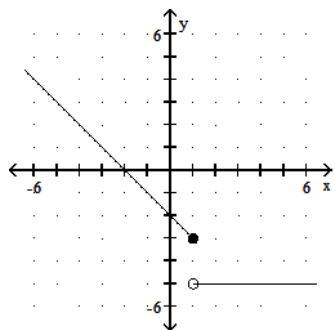


70) $f(x) = \begin{cases} -2 - x, & \text{for } x < 1, \\ -5, & \text{for } x \geq 1 \end{cases}$

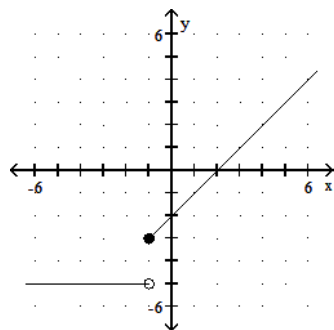


70) _____

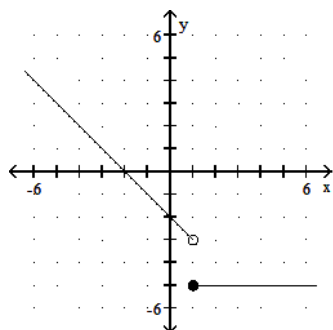
A)



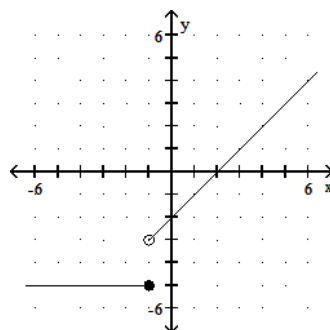
B)



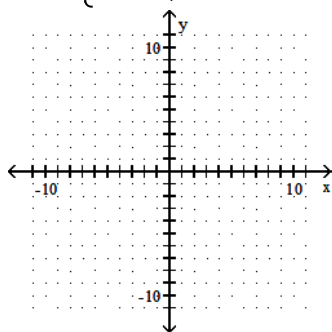
C)



D)

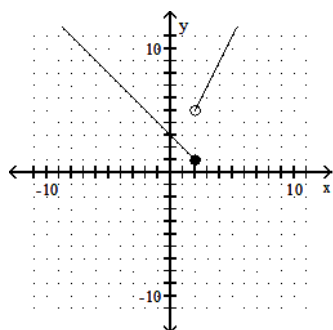


71) $f(x) = \begin{cases} 3 - x, & \text{for } x \leq 2, \\ 1 + 2x, & \text{for } x > 2 \end{cases}$

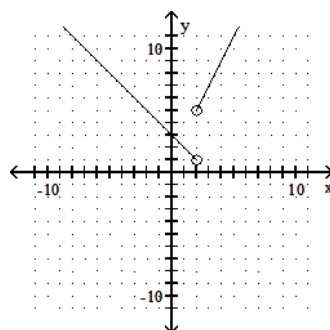


71) _____

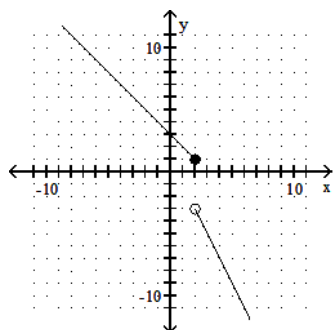
A)



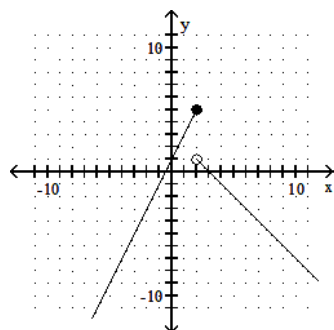
B)



C)

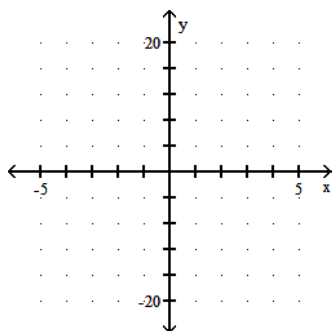


D)

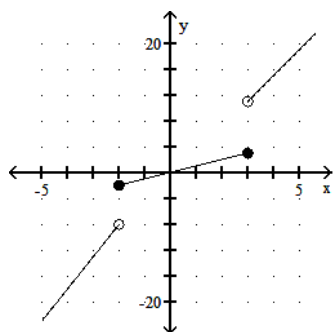


$$72) f(x) = \begin{cases} 5x + 2, & \text{for } x < -2, \\ x, & \text{for } -2 \leq x \leq 3, \\ 4x - 1, & \text{for } x > 3 \end{cases}$$

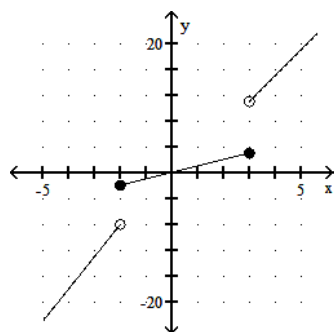
72) _____



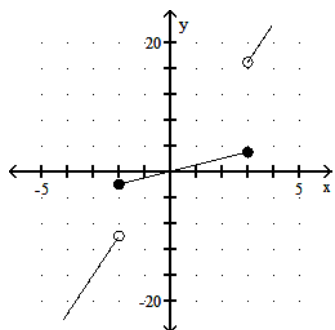
A)



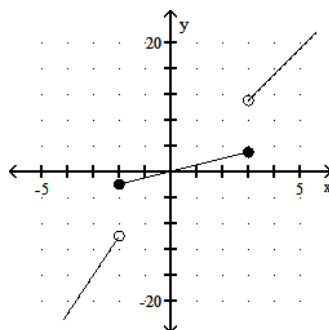
B)



C)



D)



73) Determine the y-intercept of the graph of the following function: $y = 3x + 8$.

73) _____

- A) $(0, 8)$
- B) $\left(-\frac{8}{3}, 0\right)$
- C) $\left(0, -\frac{8}{3}\right)$
- D) $(8, 0)$
- E) none of these

74) Determine the intercepts of the graph of $f(x) = -4x - \frac{3}{4}$.

74) _____

- A) $\left(-\frac{3}{16}, 0\right)$ and $\left(0, -\frac{3}{4}\right)$
- B) $\left(-\frac{3}{4}, 0\right)$ and $\left(0, \frac{3}{16}\right)$
- C) $\left(\frac{3}{16}, 0\right)$ and $\left(0, -\frac{3}{4}\right)$
- D) $(-3, 0)$ and $\left(0, -\frac{3}{4}\right)$
- E) $(3, 0)$ and $\left(0, -\frac{3}{4}\right)$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

75) Determine the intercepts of the following function: $f(x) = 5 - 2x$.
Enter your answer exactly as two ordered pairs, with the x-intercept first.

75) _____

76) Determine the y-intercept of the following function: $f(x) = 3$.
Enter your answer as just an ordered pair.

76) _____

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

Determine the intercepts on the graph of the equation.

77) $f(x) = 4x + 3$ 77) _____
 A) $\left(-\frac{3}{4}, 0\right); (0, 3)$ B) $(3, 0); \left(0, -\frac{3}{4}\right)$ C) $\left(\frac{3}{4}, 0\right); (0, 3)$ D) $\left(-\frac{4}{3}, 0\right); (0, 4)$

78) $f(x) = 9x$ 78) _____
 A) $(9, 0); (0, 0)$ B) $(0, 0); (0, 9)$ C) $(1, 0); (0, -9)$ D) $(0, 0)$

79) $y = x + 3$ 79) _____
 A) $(3, 0); (0, -3)$ B) $(3, 0); (0, 3)$ C) $(0, 0)$ D) $(-3, 0); (0, 3)$

80) $y = -4x - 1$ 80) _____
 A) $\left(\frac{1}{4}, 0\right); (0, 1)$ B) $\left(\frac{1}{4}, 0\right); (0, -4)$ C) $\left(-\frac{1}{4}, 0\right); (0, -1)$ D) $(-1, 0); \left(0, \frac{1}{4}\right)$

81) The quadratic function $y = -9x - 8x^2 + 5$ has the form $y = ax^2 + bx + c$. 81) _____
 Identify a, b, and c in the order a, b, c.
 A) -9, -8, 5
 B) 5, -8, -9
 C) -8, -9, 5
 D) 9, 8, 5
 E) none of these

82) The quadratic function, $y = \frac{8x^2 + 7x - 2}{4}$, has the form $y = ax^2 + bx + c$. Identify a, b, and c. 82) _____
 A) $2, \frac{7}{4}, -\frac{1}{2}$
 B) 8, 7, -2
 C) 8, 7, 2
 D) -2, $-\frac{7}{4}, \frac{1}{2}$
 E) none of these

The given quadratic function has the form $y = ax^2 + bx + c$. Identify a, b, and c.

83) $y = 8 - 2x^2$ 83) _____
 A) $a = -2$
 $b = 0$
 $c = 8$
 B) $a = 2$
 $b = 0$
 $c = 8$
 C) $a = -2$
 $b = 8$
 $c = 0$
 D) $a = 8$
 $b = -2$
 $c = 0$

$$84) y = \frac{1}{4}x^2 - 4\pi x + \sqrt{6}$$

84) _____

A) $a = 4$
 $b = -4\pi$
 $c = 6$

B) $a = \frac{1}{4}$
 $b = -4\pi$
 $c = \sqrt{6}$

C) $a = \frac{1}{4}$
 $b = 4$
 $c = \sqrt{6}$

D) $a = \frac{1}{4}$
 $b = 4\pi$
 $c = \sqrt{6}$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

- 85) Evaluate $f(x) = |3 - |x||$ when $x = -6$.
 Enter your answer exactly in the form: $f(-6) = a$
 where a is an integer.

85) _____

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

Evaluate the function at the given value of x .

86) $f(x) = |x|$, $x = 13^{-4}$

A) $f(13^{-4}) = 17$

B) $f(13^{-4}) = 13^{-4}$

C) $f(13^{-4}) = 13^4$

D) $f(13^{-4}) = 52$

86) _____

87) $f(x) = x^{210}$, $x = -1$

A) $f(-1) = 210$

B) $f(-1) = 1$

C) $f(-1) = -210$

D) $f(-1) = -1$

87) _____

Solve the problem.

- 88) In a certain city, the cost of a taxi ride is computed as follows: There is a fixed charge of \$2.90 as soon as you get in the taxi, to which a charge of \$2.40 per mile is added. Express the cost of an x -mile taxi ride as a function of the number of miles driven.

A) $C(x) = 5.30x$

B) $C(x) = 2.40x + 2.90$

C) $C(x) = 2.90x + 2.40$

D) $C(x) = 3.80x$

88) _____

- 89) A moving firm charges a flat fee of \$40 plus \$35 per hour. Express the cost of a move as a function of the hours it takes to complete the move.

A) $C(x) = 35x - 40$

B) $C(x) = 40x + 35$

C) $C(x) = 35x + 40$

D) $C(x) = 40x - 35$

89) _____

- 90) A cab company charges a base rate of \$2.00 plus 20 cents per minute. Express the cost of a cab ride as a function of the number of minutes the ride takes.

A) $C(x) = 2.00x + 0.20$

B) $C(x) = 0.20x + 2.00$

C) $C(x) = 0.20x - 2.00$

D) $C(x) = 2.00x - 0.20$

90) _____

- 91) An electrician charges a fee of \$40 plus \$25 per hour. Express the cost of the electrician's services as a function of the amount of time he spends on the job.

A) $C(x) = 25x + 40$

B) $C(x) = 40x + 25$

C) $C(x) = 40x - 25$

D) $C(x) = 25x - 40$

91) _____

- 92) A cable TV company charges \$23 per month for the basic service plus \$7 for each movie channel. Express the cost of a monthly cable bill as a function of additional movie channels. 92) _____
 A) $C(x) = 23x - 7$ B) $C(x) = 7x - 23$ C) $C(x) = 23x + 7$ D) $C(x) = 7x + 23$
- 93) A store is discounting all regularly priced items by 25%. (i) Find a function f that computes the sale price of an item having a regular price of x . (ii) If an item normally costs \$190.91, what is its sale price? 93) _____
 A) $f(x) = x - 25$; \$165.91 B) $f(x) = x - 0.25$; \$190.66
 C) $f(x) = x - 0.25x$; \$143.18 D) $f(x) = 0.25x$; \$47.73
- 94) A store is discounting all regularly priced items by 50%. (i) Find a function f that computes the sale price of an item having a regular price of x . (ii) Find the regular price of an item that costs \$80.22 on sale. 94) _____
 A) $f(x) = x - 0.5x$; \$160.44 B) $f(x) = x - 0.5$; \$80.72
 C) $f(x) = 0.5 + x$; \$79.72 D) $f(x) = 0.5x$; \$160.44

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Let $f(x) = x^2 - x + 2$, and $g(x) = 4x + 5$. Calculate the following function(s):

- 95) $f(x) + g(x)$ 95) _____
 Enter your answer exactly as a polynomial in standard form.
 Do not label the polynomial.

- 96) $f(x)g(x)$ 96) _____
 Enter your answer exactly as a polynomial in standard form.
 Do not label the polynomial.

Let $f(x) = x^6 + 1$, $g(x) = x^3 + 1$. Calculate the following function(s) and express in simplest terms:

- 97) $f(x) + g(x)$ 97) _____
 Enter your answer exactly as a polynomial in standard form.
 Do not label the polynomial.

- 98) $f(x) - g(x)$ 98) _____
 Enter your answer exactly as a polynomial in standard form.
 Do not label the polynomial.

- 99) $\frac{f(x)}{g(x)}$ for $x \neq -1$ 99) _____
 Enter your answer as exactly $\frac{P(x)}{Q(x)}$ where P and Q are polynomials in standard form.
 Do not label your answer.

- 100) $f(x)g(x)$ 100) _____
 Enter your answer exactly as a polynomial in standard form.
 Do not label the polynomial.

Let $f(x) = \frac{x}{x-1}$ and $g(x) = \frac{2}{x+1}$. Calculate the following function(s) and express in simplest terms:

101) $f(x) + g(x)$ for $x \neq \pm 1$

101) _____

Enter your answer exactly as $\frac{P(x)}{Q(x)}$ where P and Q are polynomials in standard form.

Do not label your answer.

102) $f(x) - g(x)$ where $x \neq \pm 1$

102) _____

Enter your answer exactly as $\frac{P(x)}{Q(x)}$ where P and Q are polynomials in standard form.

Do not label your answer.

103) $f(x)g(x)$ where $x \neq \pm 1$

103) _____

Enter your answer exactly as $\frac{P(x)}{Q(x)}$ where P and Q are polynomials in standard form.

Do not label your answer.

104) $\frac{f(x)}{g(x)}$ where $x \neq \pm 1$

104) _____

Enter your answer as exactly $\frac{P(x)}{Q(x)}$ where P and Q are polynomials in standard form.

Do not label your answer.

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

Use the given functions to find the requested function.

105) $f(x) = 5x + 8$, $g(x) = 3x^2$

105) _____

Find $(fg)(x)$.

A) $15x^2 + 24x$

B) $15x^3 + 24x^2$

C) $3x^2 + 5x + 8$

D) $15x + 24$

106) $f(x) = 7x + 9$, $g(x) = 4x^2$

106) _____

Find $(f + g)(x)$.

A) $4x^2 + 7x + 9$

B) $\frac{7x+9}{4x^2}$

C) $28x^3 + 36x$

D) $7x + 9 - 4x^2$

107) $f(x) = 6x + 6$, $g(x) = 2x^2$

107) _____

Find $(g - f)(x)$.

A) $4x^3 + 4x^2$

B) $2x^2 - 6x - 6$

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

D) $6x + 6 - 2x^2$

108) $f(x) = 6x + 8$, $g(x) = 2x^2$

108) _____

Find $(g/f)(x)$.

A) $2x^2 + 6x + 8$

B) $12x^2 + 16x$

C) $\frac{2x^2}{6x+8}$

D) $\frac{6x+8}{2x^2}$

109) $f(x) = 9x^2 - 5x$, $g(x) = x^2 - 3x - 10$

Find f/g .

A) $\frac{9x}{x+1}$

B) $\frac{9-x}{10}$

C) $\frac{9x-5}{-3}$

D) $\frac{9x^2 - 5x}{x^2 - 3x - 10}$

109) _____

Express the following as a rational function.

110) $f(x) = \frac{7x+6}{7x-8}$; $g(x) = \frac{9x}{7x-8}$

Find $f - g$.

A) $(f - g)(x) = \frac{2x-6}{7x-8}$

B) $(f - g)(x) = \frac{16x-6}{7x-8}$

C) $(f - g)(x) = \frac{-2x+6}{7x-8}$

D) $(f - g)(x) = \frac{2x+6}{7x-8}$

110) _____

111) $f(x) = \frac{x}{x+3}$; $g(x) = \frac{5x+3}{x-3}$

Find $\frac{f(x+3)}{g(x+3)}$

A) $\frac{5x^2+3x}{x^2+48x+108}$

B) $\frac{x+3}{5x^2+9x+36}$

C) $\frac{x^2+3x}{5x^2+48x+36}$

D) $\frac{x^2+3x}{5x^2+48x+108}$

111) _____

112) $f(x) = \frac{x-9}{x+9}$

Find $f\left(\frac{1}{t}\right)$

A) $\frac{9t+1}{9t-1}$

B) $\frac{9t-1}{9t+1}$

C) $\frac{1-9t}{1+9t}$

D) $\frac{1+9t}{1-9t}$

112) _____

Find $\frac{f(x+h) - f(x)}{h}$ and simplify.

113) $f(x) = x^2 + 5x$

A) $2xh + h + 5x$

B) $2x + h + 1$

C) $2x + h + 5$

D) $h + 5$

113) _____

114) Let $f(x) = \frac{1}{x+1}$, and $g(x) = \frac{1}{x+2}$ $x \neq -1, -2$. Calculate $g(f(x))$.

114) _____

A) $\frac{x+1}{x+2}$

B) $\frac{x+1}{2x+3}$, $x \neq -\frac{3}{2}$

C) $\frac{x+1}{3x+2}$

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

E) none of these

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Let $f(x) = x^2 - x + 2$, and $g(x) = 4x + 5$. Calculate the following function(s):

115) $f(g(x))$

115) _____

Enter your answer exactly as a polynomial in standard form.

Do not label the polynomial.

Let $f(x) = x^6 + 1$, $g(x) = x^3 + 1$. Calculate the following function(s) and express in simplest terms:

116) $f(g(x))$

116) _____

Do not simplify your answer at all.

Let $f(x) = \frac{x}{x-1}$ and $g(x) = \frac{2}{x+1}$. Calculate the following function(s) and express in simplest terms:

117) $f(g(x))$ where $x \neq \pm 1$

117) _____

Enter you answer as exactly $\frac{P(x)}{Q(x)}$ where P and Q are polynomials in standard form.

Do not label your answer.

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

Solve the problem.

118) If $f(x) = 5x + 15$ and $g(x) = 4x - 1$, find $f(g(x))$.

118) _____

A) $20x + 14$

B) $20x + 10$

C) $20x + 59$

D) $20x + 20$

119) If $f(x) = -6x + 8$ and $g(x) = 4x + 2$, find $g(f(x))$.

119) _____

A) $24x + 34$

B) $-24x + 34$

C) $-24x + 20$

D) $-24x - 30$

120) If $f(x) = 4x^2 + 2x + 5$ and $g(x) = 2x - 4$, find $g(f(x))$.

120) _____

A) $8x^2 + 4x + 6$

B) $8x^2 + 4x + 14$

C) $4x^2 + 2x + 1$

D) $4x^2 + 4x + 6$

- 121) A stone is thrown into a pond. A circular ripple is spreading over the pond in such a way that the radius is increasing at the rate of 4.1 feet per second, modeled by the function $r(t) = 4.1t$. The area of a circular ripple is given by the function $A(x) = \pi x^2$, where x is the radius of the circle. Express the area of the ripple as a (composite) function of the number of seconds that have passed since the stone entered the pond. 121) _____

- A) $A(r(t)) = 4.1\pi t^2$ B) $A(r(t)) = 16.81\pi^2 t$
C) $A(r(t)) = 16.81\pi t^2$ D) $A(r(t)) = 8.2\pi t^2$

- 122) The table below shows a conversion table for women's shoe sizes in three different countries. The function $g(x) = 10x + 5$ converts from Country A sizes to Country B sizes, and the function $f(x) = 0.1x$ converts from Country B sizes to Country C sizes. Determine the function $h(x) = f(g(x))$ and give its interpretation. 122) _____

Country A	5	6	7	8
Country B	55	65	75	85
Country C	5.5	6.5	7.5	8.5

- A) $h(x) = x + 0.5$; converts from Country A sizes to Country C sizes
B) $h(x) = 10x + 0.5$; converts from Country A sizes to Country C sizes
C) $h(x) = x - 0.5$; converts from Country C sizes to Country A sizes
D) $h(x) = x + 5$; converts from Country A sizes to Country B sizes, then back to Country A sizes

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 123) Use the quadratic formula to find the zeros of the function $f(x) = x^2 - 3x - 28$. 123) _____
Enter your answer exactly in the form: a, b
where $a < b$, a and b integers.

- 124) Use the quadratic formula to find the zeros of the function $g(x) = 3x^2 + 6x - 8$. 124) _____
Enter your answer exactly in the form: $\frac{d \pm \sqrt{e}}{f}$ where d, e , and f are integers.

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

- 125) Use the quadratic formula to find the zeros of the function $f(x) = -x^2 - x - \frac{1}{4}$. 125) _____
A) 2
B) $\frac{1 \pm \sqrt{2}}{2}$
C) $-\frac{1}{2}$
D) $\pm \frac{1}{2}$
E) none of these

126) Use the quadratic formula to solve the equation $-8x^2 - 3x + 6 = 0$.

126) _____

- A) 0, -1
- B) no solution
- C) $\frac{-3 \pm \sqrt{57}}{16}$
- D) $\frac{\pm 3 \pm \sqrt{39}}{16}$
- E) none of these

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use the quadratic formula to solve the following equation(s):

127) $x^2 + 4x + 3 = 0$

127) _____

Enter your answer exactly in the form: a,b where $a < b$, a and b integers.

128) $x^2 - 3x - 4 = 0$

128) _____

Enter you answer exactly in the form: a, b where $a < b$, a and b integers.

129) $2x^2 - 3x - 3 = 0$

129) _____

Enter your answer exactly in the form: $\frac{d \pm \sqrt{e}}{f}$ where d, e, and f are integers.

130) $t^2 + 10t + 12 = 0$

130) _____

Enter your answer exactly in the form: $d \pm \sqrt{e}$ where d and e are integers.

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

131) $y^2 + 3y - 9 = 0$

131) _____

A) $\frac{-3 - 3\sqrt{5}}{2}$

B) $-3 \pm 3\sqrt{5}$

C) $\frac{3 + 3\sqrt{5}}{2}$

D) $\frac{-3 \pm 3\sqrt{5}}{2}$

132) $q^2 + 4q - 7 = 0$

132) _____

A) $-2 \pm \sqrt{11}$

B) $-1 \pm \sqrt{11}$

C) $2 + \sqrt{11}$

D) $-2 \pm 2\sqrt{11}$

133) $p^2 + 5p - 5 = 0$

133) _____

A) $\frac{5 + 3\sqrt{5}}{2}$

B) $-5 \pm 3\sqrt{5}$

C) $\frac{-5 - 3\sqrt{5}}{2}$

D) $\frac{-5 \pm 3\sqrt{5}}{2}$

134) $x^2 - 7x + 10 = 0$

134) _____

A) -5, -2

B) 5, 2

C) 10, 4

D) -10, -4

135) $2x^2 + 6x + 1 = 0$

A) $\frac{-3 \pm \sqrt{7}}{2}$

B) $\frac{-6 \pm \sqrt{7}}{2}$

C) $\frac{-3 \pm \sqrt{11}}{2}$

D) $\frac{-3 \pm \sqrt{7}}{4}$

135) _____

136) Factor the polynomial $x^3 - 27x$.

A) $x(x + 3)(x - 3)$

B) $x^2(x + 3)$

C) $(x + 3)^2(x - 3)$

D) $x(x + 3\sqrt{3})(x - 3\sqrt{3})$

E) none of these

136) _____

137) Factor the polynomial $x^2 - 5x + 4$.

A) $(x - 4)(x - 1)$

B) $(x + 4)(x - 1)$

C) $(x + 4)(x + 1)$

D) $(x - 5)(x + 1)$

E) none of these

137) _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Factor the following polynomial(s):

138) $x^2 - 7x - 8$

Enter your answer exactly in the form: $(x - a)(x + b)$ where a and b are integers.

138) _____

139) $3x^3 - 27x$

Enter your answer exactly in the form: $ax(x - b)(x + c)$ where a, b, and c are integers.

139) _____

140) $x^4 - 16$

Enter your answer exactly in the form: $(x^a + b)(x - c)(x + d)$ where a, b, c, and d are integers.

All parentheses and signs the same as above.

140) _____

141) $x^2 - 2x + 1$

Enter your answer as $(x \pm a)^b$.

141) _____

142) $x^2 - x - 6$

Enter your answer exactly in the form: $(x - a)(x + b)$ where a, and b are integers.

All signs and parentheses the same as above.

142) _____

143) $x^3 + 7x^2 - 8x$

Enter your answer exactly in the form: $x(x + a)(x - b)$ where a and b are integers.

All signs and parentheses the same as above.

143) _____

144) $6x^2 - 11x + 3$ Enter your answer exactly in the form: $(ax - b)(cx - d)$ where $a \geq c$ and $a, b, c,$ and d are integers. 144) _____

145) $8x^3 - 14x^2 - 15x$ Enter your answer exactly in the form: $x(ax + b)(cx - d)$ All signs and parentheses the same as above. 145) _____

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

Factor completely.

146) $x^2 + 4x - 32$ 146) _____
 A) $(x + 8)(x - 4)$ B) $(x - 8)(x + 4)$ C) prime D) $(x - 8)(x + 1)$

147) $x^2 - 5x - 24$ 147) _____
 A) $(x + 3)(x - 8)$ B) $(x - 3)(x + 8)$ C) prime D) $(x - 3)(x + 1)$

148) $x^2 + 7x + 12$ 148) _____
 A) $(x + 12)(x - 1)$ B) $(x - 4)(x - 3)$ C) $(x + 12)(x + 7)$ D) $(x + 4)(x + 3)$

149) $5x^2 - 34x - 48$ 149) _____
 A) $(x - 6)(x - 8)$ B) $(6x + 5)(x - 8)$ C) $(x + 5)(x - 8)$ D) $(5x + 6)(x - 8)$

150) $7x^2 - 20x + 12$ 150) _____
 A) $(7x + 6)(7x - 6)$ B) $(6 - 7x)(7x - 6)$ C) $(7x - 6)(x - 2)$ D) $(7x - 6)(x + 2)$

151) $7x^2 - 7x - 42$ 151) _____
 A) $7(x + 2)(x - 3)$ B) $7(x - 2)(x + 3)$ C) prime D) $(7x + 14)(x - 3)$

152) $24x^2 - 104x - 80$ 152) _____
 A) $(24x + 16)(x - 5)$ B) $8(3x - 2)(x + 5)$
 C) $8(3x + 2)(x - 5)$ D) prime

153) $4x^2 - 25$ 153) _____
 A) $(2x - 5)^2$ B) prime C) $(2x + 5)^2$ D) $(2x + 5)(2x - 5)$

154) $x^2 + 32x + 256$ 154) _____
 A) $(x - 16)^2$ B) $(x + 16)(x - 16)$ C) $(x + 16)^2$ D) prime

155) $49x^2 + 112x + 64$ 155) _____
 A) Prime B) $(7x - 8)^2$ C) $(7x + 8)(7x - 8)$ D) $(7x + 8)^2$

- 156) $147x^2 + 210x + 75$ 156) _____
 A) $(21x + 15)(7x + 5)$ B) $3(49x^2 + 70x + 25)$
 C) $3(7x - 5)(7x + 5)$ D) $3(7x + 5)^2$
- 157) $64p^3 - 1$ 157) _____
 A) $(4p - 1)(16p^2 + 1)$ B) $(64p - 1)(p^2 + 4p + 1)$
 C) $(4p + 1)(16p^2 - 4p + 1)$ D) $(4p - 1)(16p^2 + 4p + 1)$
- 158) $x^3 - 343$ 158) _____
 A) $(x + 7)(x^2 - 7x + 49)$ B) $(x - 7)(x^2 + 49)$
 C) $(x + 343)(x^2 - 1)$ D) $(x - 7)(x^2 + 7x + 49)$
- 159) Find the point(s) of intersection of the pair of curves $y = x^3 - x$ and $y = 3x$. 159) _____
 A) $(0, 0)$, $(4, 0)$, and $(-4, 0)$
 B) $(0, 0)$, $(2, 6)$, and $(-2, -6)$
 C) $(0, 0)$ and $(1, 0)$
 D) $(0, 0)$
 E) none of these
- 160) Find the point(s) of intersection of the pair of curves $y = x^3 - 4x^2 - 16x$ and $y = 5x$. 160) _____
 A) $(7, 5)$ and $(-3, 5)$
 B) $(0, 0)$, $(-3, -15)$, and $(7, 35)$
 C) $(0, 0)$ and $(7, -3)$
 D) $(5, -7)$ and $(5, 3)$
 E) none of these

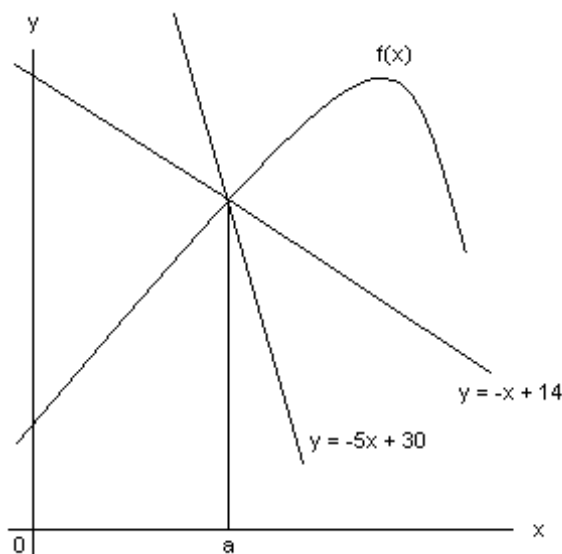
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

- 161) Find the points of intersection of the pairs of curves $y = 3x^2 - x - 2$ and $y = x^2 - 2x - 1$. 161) _____
 Enter your answer exactly in the form: (a, b) , (c, d) where a, b, c , and d are fractions of form $\frac{e}{f}$ in lowest terms, or integers, and $a > c$.
- 162) Find the points of intersection of the pairs of curves $y = \frac{1}{2}x + 4$ and $y = (x - 2)^2$. 162) _____
 Enter your answer exactly in the form: (a, b) , (c, d) where a, b, c , and d are fractions of form $\frac{e}{f}$ in lowest terms, or integers, and $a < c$.

- 163) Two lines intersect the graph of a function $y = f(x)$ as shown. Find a and $f(a)$.
Enter your answer exactly in the form: a, b where b is $f(x)$, and a, b are integers.

163) _____



Solve the following equation(s):

164) $x - \frac{4}{x} = 0$

164) _____

Enter your answer exactly in the form: a, b where a and b are integers, and $a < b$.

165) $\frac{x^3 - 81x}{x^2 + 1} = 0$

165) _____

Enter your answer exactly in the form: a, b, c , where a, b , and c are integers and $a < b < c$.

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

Solve the equation for x

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

166) _____

- A) $x = -3, 0, 2$
- B) $x = -3, 2$
- C) $x = -6, -1, 0$
- D) $x = -2, 0, 3$
- E) $x = -2, 3$

$$167) x^3 + 6x - \frac{16}{x} = 0$$

167) _____

A) $x = \frac{\pm\sqrt{112}}{14}$

B) $x = 0, \pm\sqrt{2}$

C) $x = -8, 2$

D) $x = \pm\sqrt{2}$

E) none of these

Solve.

$$168) 1 - \frac{7}{x} - \frac{44}{x^2} = 0$$

168) _____

A) -11, 4

B) -11, -4

C) 11, 4

D) 11, -4

$$169) \frac{28}{x} + x = -11$$

169) _____

A) 7, 4

B) -11, 28

C) -7, -4

D) 28

$$170) \frac{30}{x} - \frac{30}{x-6} = \frac{3}{x}$$

170) _____

A) -66

B) -58

C) -54

D) 4

$$171) \frac{7}{x-7} + \frac{10}{x} = \frac{-70}{x^2 - 7x}$$

171) _____

A) 0, 7

B) 0

C) -7

D) No solution

Solve the problem.

172) Suppose the cost of producing x items is given by $C(x) = 5000 - x^3$ and the revenue made on the sale of x items is $R(x) = 500x - 10x^2$. Find the number of items which serves as a break-even point.

172) _____

A) 25 items

B) 5 items

C) 100 items

D) 10 items

173) A rock falls from a tower that is 448 feet high. As it is falling, its height is given by the formula $h = 448 - 16t^2$. How many seconds (in tenths) will it take for the rock to hit the ground ($h = 0$)?

173) _____

A) 20.8 sec

B) 21.2 sec

C) 5.3 sec

D) 12,544 sec

174) Compute the number, $(0.000008)^{1/3}$.

174) _____

A) 0.02

B) 0.0027

C) 0.2

D) 0.024

E) none of these

175) Compute the number, $16^{2.25}$.

- A) 512
- B) 268
- C) 64
- D) 36
- E) none of these

175) _____

176) Compute the number, $(3125)^{0.6}$.

- A) 628
- B) 125
- C) 1875
- D) 2521
- E) none of these

176) _____

177) Compute the number, $(0.0001)^{-1.25}$.

- A) 12,500
- B) 125,000
- C) 10,000
- D) 100,000
- E) none of these

177) _____

178) Evaluate $f(32)$ for $f(x) = x^{7/5}$.

- A) 128
- B) 256
- C) 8
- D) 64
- E) none of these

178) _____

179) Evaluate $f(19)$ for $f(x) = x^0$.

- A) 0
- B) 19
- C) 1
- D) 10
- E) none of these

179) _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Compute the number(s).

180) $8^{4/3}$ Enter your answer as an integer.

180) _____

181) 3285963^0 Enter your answer as an integer.

181) _____

182) $216^{2/3}$ Enter your answer as an integer.

182) _____

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

Evaluate the expression. Write your answer without exponents.

183) 2^{-2}

183) _____

A) 4

B) -4

C) $\frac{1}{-4}$

D) $\frac{1}{4}$

184) $\frac{1}{6^{-2}}$

184) _____

A) 12

B) 36

C) 216

D) 6

185) $\frac{3^{-4}}{2^{-2}}$

185) _____

A) $\frac{4}{81}$

B) $\frac{8}{243}$

C) $\frac{81}{4}$

D) $\frac{243}{8}$

186) $\frac{1}{-4^{-4}}$

186) _____

A) -64

B) -256

C) 256

D) 64

187) $(-2)^{-5}$

187) _____

A) -32

B) 32

C) $-\frac{1}{32}$

D) $\frac{1}{32}$

188) $(-2)^{-6}$

188) _____

A) -64

B) 64

C) $\frac{1}{64}$

D) $\frac{1}{-64}$

189) 5^0

189) _____

A) 1

B) -1

C) 0

D) 5

190) $(-8)^0$

190) _____

A) 1

B) -8

C) 0

D) -1

191) $\left(\frac{7}{2}\right)^{-3}$

191) _____

A) $\frac{343}{8}$

B) $\frac{1}{343}$

C) $\frac{8}{343}$

D) $\frac{2}{343}$

Evaluate the expression.

192) $216^{1/3}$ A) 6 B) 1296 C) 18 D) 3888 192) _____

193) $-32^{1/5}$ A) 32 B) -8 C) 16 D) -2 193) _____

194) $\left(\frac{81}{49}\right)^{1/2}$ A) $\frac{8}{8}$ B) $\frac{9}{7}$ C) $\frac{8}{7}$ D) $\frac{9}{8}$ 194) _____

195) $216^{4/3}$ A) 1296 B) 279,936 C) 7776 D) 46,656 195) _____

196) $64^{-4/3}$ A) $-\frac{1}{256}$ B) $\frac{1}{4}$ C) -256 D) $\frac{1}{256}$ 196) _____

197) $\left(\frac{343}{8}\right)^{-2/3}$ A) $\frac{49}{4}$ B) $\frac{4}{343}$ C) $\frac{4}{49}$ D) $-\frac{49}{4}$ 197) _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use the laws of exponents to compute the number.

198) $\left((8^{1/3})^2\right)^{3/4}$ Enter your answer as $a^{b/c}$ where a, b, c are integers. 198) _____

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

199) $\frac{6^3}{2^3}$ A) 27 B) 8 C) 9 D) 3 199) _____

200) $(9 \cdot 36)^{1/2}$ A) 45 B) 36 C) 9 D) 18 200) _____

201) Use the laws of exponents to simplify the algebraic expression $(\sqrt{x+5})^3)^{1/4}$.

201) _____

- A) $(x+5)^{3/4}$
- B) $(x+5)^{1/2}$
- C) $(x+5)^{3/2}$
- D) $(x+5)^{3/8}$
- E) none of these

202) Use the laws of exponents to simplify the algebraic expression $((x+3)^{4/3} \cdot (x-2)^{-1/3})^2$.

202) _____

- A) $\frac{(x+3)^{8/3}}{(x-2)^3}$
- B) $\frac{(x+3)^{8/3}}{(x-2)^{2/3}}$
- C) $\frac{1}{(x^2+x-6)^{8/3}}$
- D) $(x^2+x-6)^2$
- E) none of these

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use the laws of exponents to simplify the algebraic expression. Your answer should not involve parentheses or negative exponents.

203) $\frac{x^7}{y^9x^{-3}}$ Enter your answer as $x^a y^b$ where a and b are integers.

203) _____

204) $(9x)^{-3/2}$ Enter your answer as: $\frac{a}{b}x^{c/d}$ where a, b, c, and d are integers

204) _____

205) $\sqrt{x}\left(\frac{1}{8x^3}\right)^{1/3}$ Enter your answer as: $\frac{a}{b}x^{c/d}$ where a, b, c, and d are integers.

205) _____

206) $\sqrt[3]{x^2} \cdot \sqrt[5]{x^4}$ Enter your answer as: $x^{a/b}$ where a, b are integers.

206) _____

207) $\frac{1}{x^{-5}y^{-2}}$ Enter your answer as: $x^a y^b$ where a, b are integers.

207) _____

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

Simplify the expression. Write your answer without negative exponents. Whenever an exponent is negative or zero, assume that the base is not zero.

208) $(x^{-8})^8$ 208) _____
 A) $-x^{64}$ B) $\frac{1}{x^{64}}$ C) $-8x^8$ D) $-8x^{64}$

209) $(x^8)^{-3}$ 209) _____
 A) $\frac{1}{x^{24}}$ B) $-x^{24}$ C) $-3x^{24}$ D) $-3x^8$

210) $(x^{-7})^{-3}$ 210) _____
 A) $\frac{1}{x^{21}}$ B) $\frac{1}{x^{10}}$ C) x^{21} D) $-x^{10}$

211) $\frac{x^{11}}{x^5}$ 211) _____
 A) $\frac{1}{x^6}$ B) x^6 C) x^{16} D) x^2

212) $\left(\frac{-5x}{y^4}\right)^{-3}$ 212) _____
 A) $-\frac{y^{12}}{125x^3}$ B) $\frac{5y^{12}}{x^3}$ C) $\frac{y^{12}}{125x^3}$ D) $-\frac{5y^{12}}{x^3}$

Calculate the following function. Take $x > 0$.

213) Let $f(x) = \sqrt[5]{x}$ and $g(x) = \frac{1}{x^8}$ 213) _____

Find $g(x)[f(x)]^5$

A) $x^{9/8}$ B) $\frac{1}{x^7}$ C) $\frac{1}{x^8}$ D) x^7

214) Let $f(x) = \sqrt[5]{x}$ and $g(x) = \frac{1}{x^6}$ 214) _____

Find $g(f(x))$

A) $\frac{1}{x^{5/6}}$ B) $\frac{1}{x^{6/5}}$ C) $x^{5/6}$ D) $x^{6/5}$

215) The expression may be factored as shown. Find the missing factor.

215) _____

$$17x^{4/5} + x^{-1/5} = x^{-1/5}(\quad)$$

- A) $17x + 1$
- B) $17x^{6/5} + x^{4/5}$
- C) $17x^{6/5} + x$
- D) $17x + x^{4/5}$
- E) none of these

216) The expression may be factored as shown. Find the missing factor.

216) _____

$$\sqrt{\frac{2x}{y}} + \sqrt{\frac{y}{x}} = \sqrt{2xy}(\quad)$$

- A) $\frac{\sqrt{x^2 + 2y^2}}{\sqrt{2xy}}$
- B) $\frac{\sqrt{2x^2 + y^2}}{2xy}$
- C) $\frac{\sqrt{x^2 + 2y^2}}{2xy}$
- D) $\frac{\sqrt{x^2 + y^2}}{\sqrt{2xy}}$
- E) none of these

217) Calculate the compound amount from the given data:

217) _____

principal = \$7000, compounded annually, 19 years, annual rate = 6%

- A) \$14,980.00
- B) \$21,179.20
- C) \$19,980.37
- D) \$14,560.00

218) Calculate the compound amount from the given data:

218) _____

principal = \$7000, compounded semiannually, 8 years, annual rate = 8%

- A) \$12,956.51
- B) \$11,480.00
- C) \$9579.98
- D) \$13,110.87

219) Calculate the compound amount from the given data:

219) _____

principal = \$1100, compounded quarterly, 2 years, annual rate = 8%

- A) \$1283.04
- B) \$1144.44
- C) \$1288.83
- D) \$1276.00

220) Calculate the compound amount from the given data:

220) _____

principal = \$1480, compounded annually 5 years, annual rate = 10%

- A) \$2383.55
- B) \$2220.00
- C) \$2166.87
- D) \$2072.00

Solve the problem.

221) Universal Bank lends \$3,600,000 for $1\frac{1}{4}$ years at 6% compounded quarterly to Shining Shores 221) _____

Development Company to fund the building of a condominium complex. Find the value at the end of the $1\frac{1}{4}$ years.

- A) \$3,870,000.00 B) \$3,878,222.40 C) \$4,817,612.09 D) \$3,871,995.41

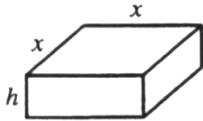
222) Lexi can invest \$7660 for 3 years at 8% compounded quarterly. Find the value at the end of the 3 years. 222) _____

- A) \$9714.73 B) \$96,493,939.20
C) \$9498.40 D) \$192,891,831.19

223) Suppose that a \$200 investment earns interest compounded semiannually. Express the value of the investment after 2 years as a polynomial in the annual rate of interest r . 223) _____

- A) $A = 200(16 + 32r + 24r^2 + 8r^3 + r^4)$ B) $A = \frac{25}{2}(8 + 16r + 12r^2 + 4r^3 + r^4)$
C) $A = \frac{25}{2}(16 + 32r + 24r^2 + 8r^3 + r^4)$ D) $A = \frac{25}{2}(16r^4 + 32r^3 + 24r^2 + 8r + 1)$

224) A warehouse is being designed. The brick walls will cost \$3 per square foot to build. The roof is to be flat and square and will cost \$24 per square foot to build. The volume of the building is to be 32,000 cubic feet. 224) _____

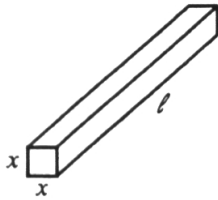


Which of the following expresses the cost of building the warehouse?

- A) $12xh + 24x^2$
B) $x^2h = 32,000$
C) $4xh + 24x^2 = 32,000$
D) $4xh + x^2$
E) none of these

- 225) A closed rectangular box is to be constructed with square ends. The volume of the box is 1000 cubic inches and its surface area is 850 square inches.

225) _____

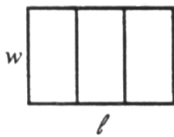


Which of the following is true?

- A) $1000 = lx^2$
- B) $2x^2 + \frac{4000}{x} = 850$
- C) $l = \frac{1000}{x^2}$
- D) $850 = 2x^2 + 4lx$
- E) all of these

- 226) A rectangular garden is to be fenced in and divided into three sections as shown below.

226) _____



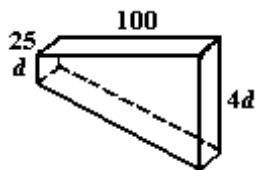
The fencing for the boundary costs \$20 per foot whereas the fencing for the dividing fences costs \$15 per foot. The gardener has \$1300 to spend and wants the garden to enclose 150 square feet.

Which of the following is true?

- A) $1300 = w^4 \cdot l^2$
- B) $150 = 4w + 2l$
- C) $1300 = 70w + 40l$
- D) The gardener cannot afford the project if the garden is 15 feet long (i.e., $l = 15$)
- E) none of these

- 227) A 25 ft x 100 ft rectangular swimming pool is to be constructed so that its maximum depth is 4 times its minimum depth. (See figure.)

227) _____



Which of the following is an expression for the volume of the pool? (Hint: Consider the figure as a composite with the top as a rectangular box and the bottom as one half of another rectangular box.)

- A) $25 \cdot 100 \cdot 4d - 25 \cdot 100 \cdot d$
- B) $25 \cdot 100 \cdot d$
- C) $25 \cdot 100 \cdot d + \left(\frac{1}{2} \cdot 100 \cdot 3d \right) \cdot 25$
- D) $\left(\frac{1}{2} \cdot 100 \cdot 4d \right) \cdot 25$
- E) none of these

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

- 228) A carpenter is building a bookcase of height h , length $2h$, and width w . The bookcase has two shelves. The plywood to be used for the back costs \$1.50 per square foot. The top, bottom, sides, and shelves will be made of pine costing \$5 per square foot. Write an equation expressing the total cost of the materials.

228) _____

Enter your answer in the form: $C = ah^b + chw$, where a , b , c are integers.

- 229) A chemical company wishes to build a cylindrical storage tank with a holding capacity of 500,000 cubic feet and a base of radius 50 feet. How tall will the tank be?

229) _____

Enter your answer as: $\frac{a}{b}$ where a , b are real numbers.

- 230) A baseball thrown straight up into the air has height $s(t) = 6 + 48t - 16t^2$ feet after t seconds. Its velocity at time t is given by $v(t) = 48 - 32t$. At what time(s) will the ball be 38 ft above the ground?

230) _____

Enter your answer exactly in the form: $t = a, b$ sec, where a , b are integers.

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

A projectile is shot straight up into the air. The function $h(t)$ gives the height of the object (in feet) after t seconds. Translate the task into both a statement involving the function and a statement involving the graph of the function.

- 231) Find the height of the object after 8 seconds. 231) _____
- A) Find $h(8)$. Find the t -coordinate of the point on the graph whose y -coordinate is 8.
 B) Solve $h(t) = 8$. Find the y -coordinates of the points on the graph whose t -coordinate is 8.
 C) Solve $h(t) = 8$. Find the t -coordinates of the points on the graph whose y -coordinate is 8.
 D) Find $h(8)$. Find the y -coordinate of the point on the graph whose t -coordinate is 8.
- 232) Determine when the height of the ball is 25 feet. 232) _____
- A) Solve $h(t) = 25$. Find the y -coordinates of the points on the graph whose t -coordinate is 25.
 B) Solve $h(t) = 25$. Find the t -coordinates of the points on the graph whose y -coordinate is 25.
 C) Find $h(25)$. Find the y -coordinate of the point on the graph whose t -coordinate is 25.
 D) Find $h(25)$. Find the t -coordinate of the point on the graph whose y -coordinate is 25.
- 233) An entrepreneur is considering opening a shop to sell kites. She estimates the cost of making x kites to be $C(x) = 100 + 15x$ and plans to sell kites for \$35 each. Which of the following statements is/are true? 233) _____
- (I) The sales revenue is given by $R(x) = 35x$.
 (II) $C(10) = 350$.
 (III) For \$400, she can produce 20 kites.
 (IV) If she sells 4 kites, her profit will be \$140.
- A) I and III
 B) II and IV
 C) I and II
 D) II and III
 E) none of these
- 234) Suppose the revenue received from the sale of x units of a product is given by $R(x) = 11x - 2x^2$ whereas the cost of producing those x units is $C(x) = \frac{1}{4}x^3 - x + \frac{1000}{x}$. What is the profit function $P(x)$? 234) _____
- A) $P(x) = \frac{1}{4}x^3 + 2x^2 - 12x + \frac{1000}{x}$
 B) $P(x) = \frac{-x^2 - 8x - 3952}{4x}$
 C) $P(x) = \frac{1}{4}x^3 - 2x^2 + 12x - 1000$
 D) $P(x) = \frac{-x^4 - 8x^3 + 48x^2 - 4000}{4x}$
 E) none of these

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

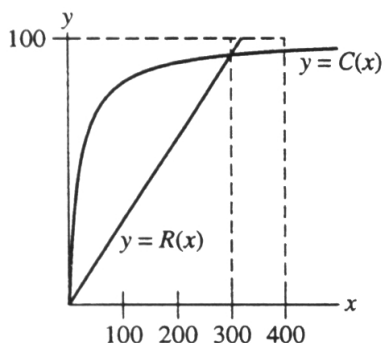
Solve the problem.

- 235) A manufacturer estimates that the hourly cost of producing x units of a product on an assembly line is $C(x) = 0.2x^3 - x^2 + 30x + 105$ dollars. What is the cost of producing 3 units of the product? 235) _____
Enter your answer as: \$abc.de

- 236) A restaurateur determines that the average daily revenue per table is given by $R(x) = -\frac{1}{4}x + 15$ when there are x tables in the dining room. The average daily cost per table is \$5.00. Determine an expression for the average daily profit per table. 236) _____
Enter your answer exactly in the form: $P(x) = -\frac{a}{b}x + c$

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

- 237) Consider the cost and revenue functions shown below, where the cost of producing x items is $C(x)$ dollars and the revenue from the sale of x items is $R(x)$ dollars. 237) _____



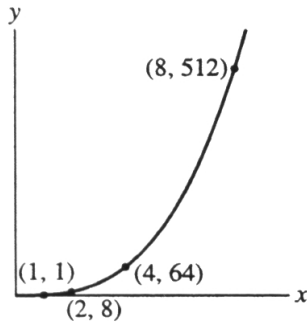
Which of the following statements is/are true?

- (I) More than 300 items must be sold in order to make a profit.
 - (II) No profit is made if fewer than 300 items are sold.
 - (III) It is better to produce even a very few items than to produce none at all.
 - (IV) The cost to produce 100 items is \$400.
- A) III only
B) I and II
C) II and III
D) II and IV
E) none of these

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

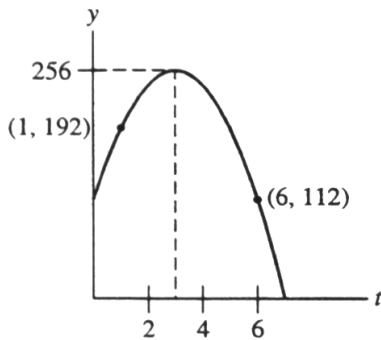
- 238) Consider the graph of the function $V(x)$ below where $V(x)$ gives the volume of a cube with sides x cm long. 238) _____



What is the volume of an 8-cm-sided cube?

Enter your answer in the form: $a \text{ cm}^3$, where a is a whole number.

- 239) The height of a toy rocket fired straight up in the air is $s(t)$ meters after t seconds. The graph of $s(t)$ is shown below. 239) _____



At what time does the rocket reach its highest point?

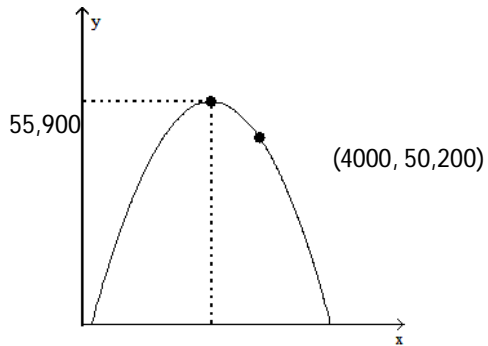
Enter your answer exactly in the form: $t = a$ seconds, where a is a whole number.

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

Refer to the graph of the profit function $y = P(x)$ to answer the question.

240)

240) _____



2700

How much more profit will be made if 2700 units are produced instead of 4000 units?

A) \$1300

B) -\$46,200

C) \$5700

D) \$53,200

Answer Key

Testname: UNTITLED13

1) D

2) B

3) C

4) D

5) C

6) D

7) D

8) C

9) C

10) D

11) B

12) D

13) A

14) C

15) B

16) A

17) D

18) E

19) C

20) $f(1) = \frac{5}{9}$, $f(-1) = 3$, $f(2) = \frac{3}{8}$

21) $g(-4) = \frac{1}{3}$

22) $h(a + 2) = \frac{a^2 + 4a + 4}{a - 4}$

23) yes

24) $-\frac{1}{2}, 3, 4$

25) -6

26) true

27) 2

28) C

29) B

30) B

31) A

32) A

33) B

34) B

35) A

36) C

37) A

38) C

39) $[3, \infty)$

Answer Key

Testname: UNTITLED13

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

41) $[4, \infty)$

42) $[-5, -3) \cup (-3, \infty)$

43) $(2, \infty)$

44) C

45) C

46) A

47) A

48) B

49) B

50) A

51) A

52) C

53) B

54) D

55) B

56) yes

57) yes

58) no

59) yes

60) yes

61) A

62) D

63) C

64) A

65) D

66) A

67) D

68) B

69) D

70) C

71) A

72) B

73) A

74) A

75) $\left(\frac{5}{2}, 0\right), (0, 5)$

76) $(0, 3)$

77) A

78) D

79) D

Answer Key

Testname: UNTITLED13

80) C

81) C

82) A

83) A

84) B

85) $f(-6) = 3$

86) B

87) B

88) B

89) C

90) B

91) A

92) D

93) C

94) A

95) $x^2 + 3x + 7$

96) $4x^3 + x^2 + 3x + 10$

97) $x^6 + x^3 + 2$

98) $x^6 - x^3$

99) $\frac{(x^6 + 1)}{(x^3 + 1)}$

100) $x^9 + x^6 + x^3 + 1$

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

102) $\frac{x^2 - x + 2}{x^2 - 1}$

103) $\frac{2x}{x^2 - 1}$

104) $\frac{x^2 + x}{2x - 2}$

105) B

106) A

107) B

108) C

109) D

110) C

111) D

112) C

113) C

114) B

115) $16x^2 + 36x + 22$

Answer Key

Testname: UNTITLED13

116) $(x^3 + 1)^6 + 1$

117) $\frac{2}{-x + 1}$

118) B

119) B

120) A

121) C

122) A

123) -4, 7

124) $\frac{-3 \pm \sqrt{3}}{3}$

125) C

126) E

127) -3, -1

128) -1, 4

129) $\frac{3 \pm \sqrt{33}}{4}$

130) $-5 \pm \sqrt{13}$

131) D

132) A

133) D

134) B

135) A

136) D

137) A

138) $(x - 8)(x + 1)$

139) $3x(x - 3)(x + 3)$

140) $(x^2 + 4)(x - 2)(x + 2)$

141) $(x - 1)^2$

142) $(x - 3)(x + 2)$

143) $x(x + 8)(x - 1)$

144) $(3x - 1)(2x - 3)$

145) $x(4x + 3)(2x - 5)$

146) A

147) A

148) D

149) D

150) C

151) A

152) C

153) D

154) C

155) D

Answer Key

Testname: UNTITLED13

156) D

157) D

158) D

159) B

160) B

161) $\left(\frac{1}{2}, -\frac{7}{4}\right), (-1, 2)$

162) $(0, 4), \left(\frac{9}{2}, \frac{25}{4}\right)$

163) 4, 10

164) -2, 2

165) -9, 0, 9

166) E

167) D

168) D

169) C

170) C

171) D

172) D

173) C

174) A

175) A

176) B

177) D

178) A

179) C

180) 16

181) 1

182) 36

183) D

184) B

185) A

186) B

187) C

188) C

189) A

190) A

191) C

192) A

193) D

194) B

195) A

196) D

Answer Key

Testname: UNTITLED13

197) C

198) $2^{3/2}$

199) A

200) D

201) D

202) B

203) $\frac{x^{10}}{y^9}$

204) $\frac{1}{27x^{3/2}}$

205) $\frac{1}{2x^{1/2}}$

206) $x^{22/15}$

207) x^5y^2

208) B

209) A

210) C

211) B

212) A

213) B

214) B

215) A

216) E

217) B

218) D

219) C

220) A

221) B

222) A

223) C

224) A

225) E

226) C

227) C

228) $C = 3h^2 + 50hw$

229) $\frac{200}{\pi}$

230) $t = 1, 2 \text{ sec}$

231) D

232) B

233) A

234) D

Answer Key

Testname: UNTITLED13

235) \$191.40

236) $P(x) = -\frac{1}{4}x + 10$

237) B

238) 512 cm^3

239) $t = 3 \text{ seconds}$

240) C