

Name \_\_\_\_\_

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

List all the elements of B that belong to the given set.

1)  $B = \{3, \sqrt{6}, -11, 0, \frac{0}{2}, 0.59, -6, 0.444...\}$

1) \_\_\_\_\_

Irrational numbers

A)  $\{\sqrt{6}\}$

B)  $\{\sqrt{6}, -6, 0.444...\}$

C)  $\left\{\sqrt{6}, \frac{0}{2}, -6\right\}$

D)  $\{\sqrt{6}, -6\}$

Find the midpoint of the line segment joining the points  $P_1$  and  $P_2$ .

2)  $P_1 = (5a, 9); P_2 = (6a, 4)$

2) \_\_\_\_\_

A)  $(a, 5)$

B)  $(11a, 13)$

C)  $\left(\frac{11a}{2}, \frac{13}{2}\right)$

D)  $\left(\frac{13a}{2}, \frac{11}{2}\right)$

Find the slope of the line.

3)

3) \_\_\_\_\_



A) -1

B) 1

C) -4

D) 4

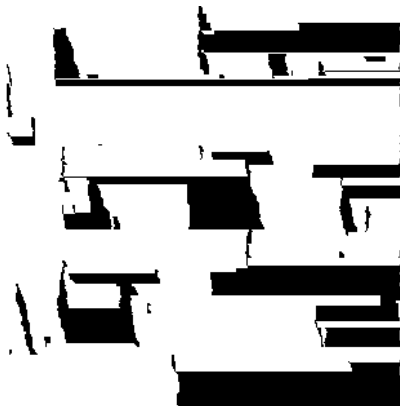
Graph the line containing the point P and having slope m.

4)  $P = (2, 8); m = -\frac{14}{5}$

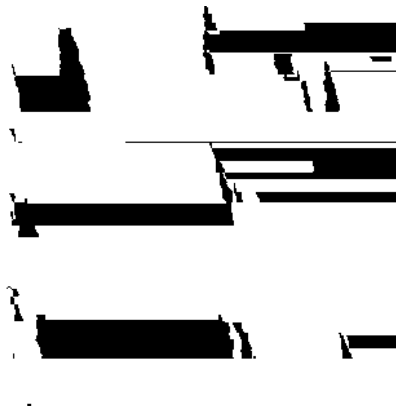
4) \_\_\_\_\_



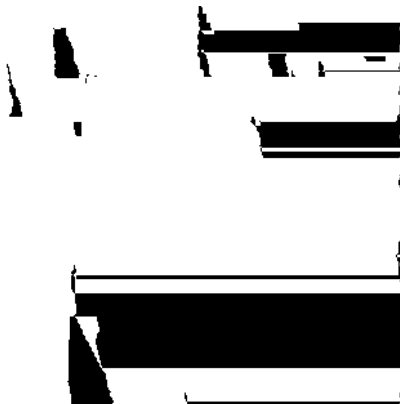
A)



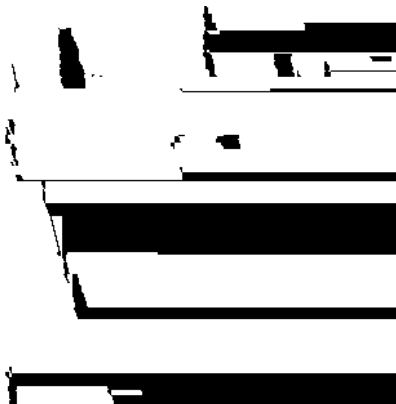
B)



C)



D)



Find an equation for the line with the given properties.

5) Slope undefined; containing the point  $\left(-\frac{5}{8}, 6\right)$

5) \_\_\_\_\_

A)  $x = -\frac{5}{8}$

B)  $x = 6$

C)  $y = 6$

D)  $y = -\frac{5}{8}$

Find the slope of the line and sketch its graph.

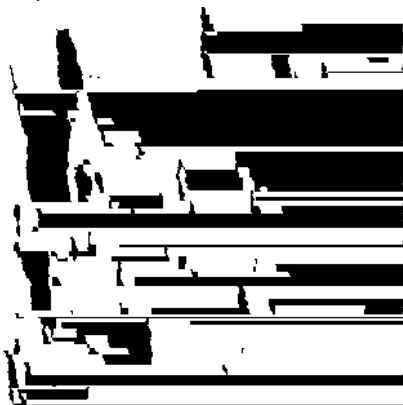
6)  $y + 4 = 0$

6) \_\_\_\_\_



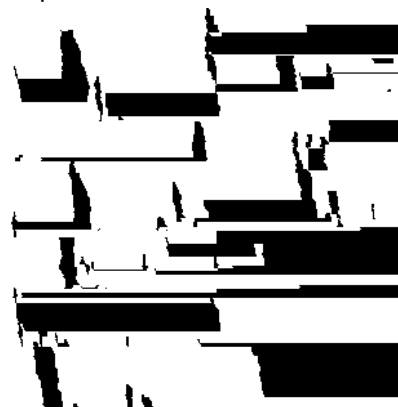
A) slope = 0

B) slope =  $-\frac{1}{4}$



C) slope = -4

D) slope is undefined



Find an equation for the line, in the indicated form, with the given properties.

7) Containing the points (2, 0) and (0, -11); general form

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

A)  $y = -\frac{11}{2}x - 11$

B)  $11x - 2y = 22$

C)  $11x + 2y = 22$

D)  $y = -\frac{11}{2}x + 2$

Find the slope-intercept form of the equation of the line with the given properties.

8) Slope = 0; containing the point (-10, -4)

A)  $x = -4$

B)  $x = -10$

C)  $y = -4$

D)  $y = -10$

8) \_\_\_\_\_

Find the slope and y-intercept of the line.

9)  $7x - 9y = 63$

A) slope =  $-\frac{7}{9}$ ; y-intercept = 7

B) slope =  $\frac{9}{7}$ ; y-intercept = 9

C) slope =  $\frac{7}{9}$ ; y-intercept = -7

D) slope = 7; y-intercept = 63

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

Solve the equation.

10)  $-7x + 50 = -2x + 15$

A)  $\{-10\}$

B)  $\{7\}$

C)  $\{-7\}$

D)  $\{10\}$

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

11)  $\frac{6x - 9}{2x - 8} = \frac{21x - 6}{7x + 7}$

A)  $\{-\frac{5}{53}\}$

B)  $\{\frac{5}{67}\}$

C)  $\{-\frac{37}{67}\}$

D)  $\{\frac{37}{53}\}$

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

Solve the problem.

12) It costs \$35 per hour plus a flat fee of \$26 for a plumber to make a house call. After writing an equation for this situation, suppose the total cost to have a plumber come to a house is \$271. How many hours did the plumber work?

A) 12 hr

B) 2 hr

C) 17 hr

D) 7 hr

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

13) Using a phone card to make a long distance call costs a flat fee of \$0.71 plus \$0.20 per minute starting with the first minute. What is an equation of the form  $y = ax + b$  for this situation?

A)  $y = 0.20x + 0.71$

B)  $y = 0.71x + 0.20$

C)  $y = 0.20x$

D)  $y = 0.71x$

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

Solve the equation by factoring.

14)  $5x^2 - 25 = 0$

A)  $\{12.5\}$

B)  $\{6\}$

C)  $\{-\sqrt{5}, \sqrt{5}\}$

D)  $\{-5, 5\}$

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

What number should be added to complete the square of the expression?

15)  $x^2 - \frac{2}{3}x$

A)  $-\frac{1}{3}$

B)  $\frac{1}{9}$

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

D)  $-\frac{2}{9}$

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

Solve the equation by completing the square.

16)  $9x^2 + 18x + 8 = 0$

A)  $\{-\frac{2}{9}, -\frac{4}{9}\}$

B)  $\{-\frac{2}{3}, -\frac{4}{3}\}$

C)  $\{\frac{2}{3}, \frac{4}{3}\}$

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

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

Find the real solutions, if any, of the equation. Use the quadratic formula and a calculator. Express any solutions rounded to two decimal places. Use 3.14 to approximate .

17)  $x^2 + x - 4 = 0$

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

A)  $\{-1.73, 0.73\}$

B)  $\{-0.73, 1.73\}$

C)  $\{-1.73, -0.73\}$

D)  $\{0.73, 1.73\}$

Solve the problem.

18) The area of a circle is found by the equation  $A = \pi r^2$ . If the area  $A$  of a certain circle is 64 square centimeters, find its radius  $r$ .

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

A) 8 cm

B)  $8\sqrt{\pi}$  cm

C)  $\{8 \text{ cm}, -8 \text{ cm}\}$

D) 8 cm

Write the expression in the standard form  $a + bi$ .

19)  $i^{16}$

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

A)  $i$

B)  $-i$

C)  $-1$

D)  $1$

Fill in the blank with the correct inequality symbol.

20) If  $x < -10$ , then  $x + 10$  \_\_\_\_\_ 0.

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

A)  $<$

B)  $]$

C)  $>$

D)  $\backslash$

Find an equation for the line with the given properties.

21) Parallel to the line  $2x + 9y = 24$ ; containing the point  $(3, -6)$

21) \_\_\_\_\_

A)  $3x + 9y = 24$

B)  $9x + 2y = -6$

C)  $2x + 9y = -48$

D)  $2x - 9y = -48$

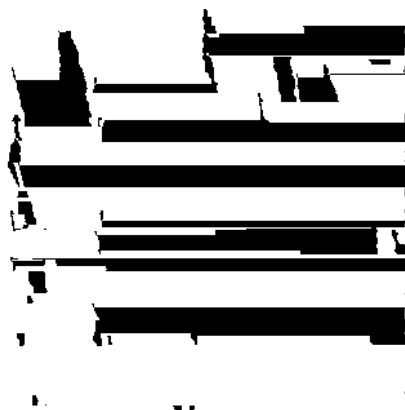
Use the slope and y-intercept to graph the linear function.

22)  $g(x) = -3x + 2$

22) \_\_\_\_\_



A)



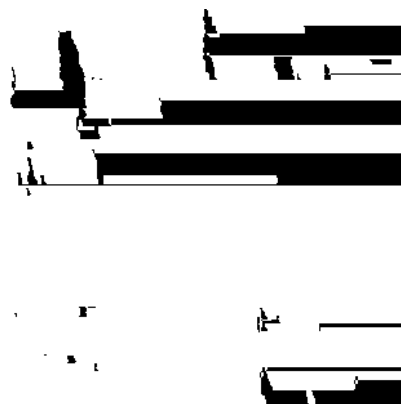
B)



C)



D)

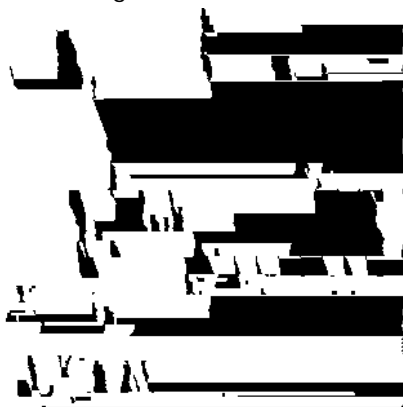


Graph the function. State whether it is increasing, decreasing, or constant..

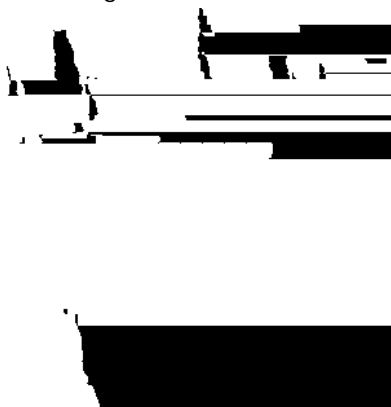
23)  $h(x) = -4x - 3$

23) \_\_\_\_\_

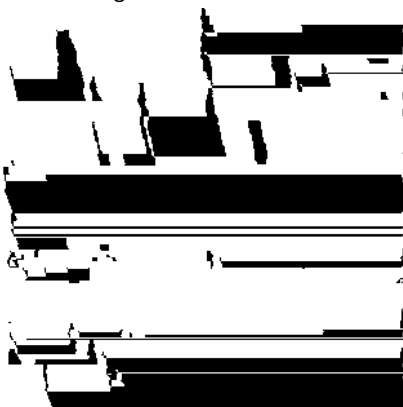
A) decreasing



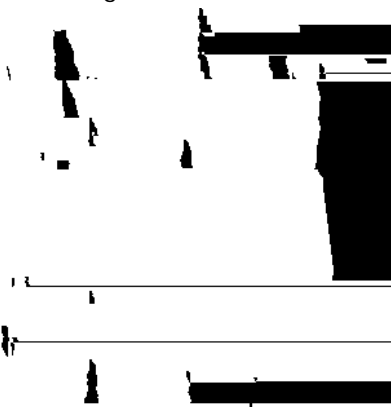
B) increasing



C) decreasing



D) increasing



Solve the problem.

24) To convert a temperature from degrees Celsius to degrees Fahrenheit, you multiply the temperature in degrees Celsius by 1.8 and then add 32 to the result. Express F as a linear function of c.

24) \_\_\_\_\_

A)  $F(c) = 33.8c$

B)  $F(c) = \frac{c - 32}{1.8}$

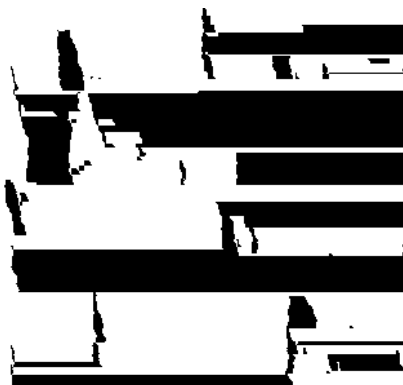
C)  $F(c) = 1.8 + 32c$

D)  $F(c) = 1.8c + 32$

Graph the function f by starting with the graph of  $y = x^2$  and using transformations (shifting, compressing, stretching, and/or reflection).

25)  $f(x) = -x^2 - 10x$

25) \_\_\_\_\_



A)



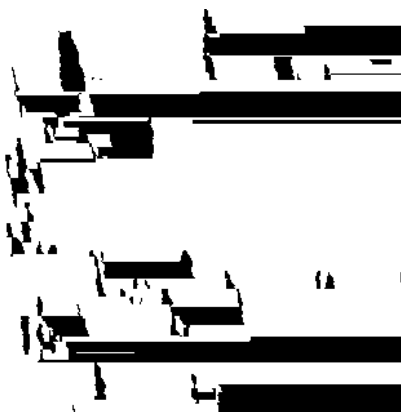
B)



C)



D)



Find the vertex and axis of symmetry of the graph of the function.

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

26) \_\_\_\_\_

A) (4, 16);  $x = 4$

B) (16, -4);  $x = 16$

C) (-4, -16);  $x = -4$

D) (-16, 4);  $x = -16$

Determine the domain and the range of the function.

27)  $f(x) = -x^2 - 6x - 5$

27) \_\_\_\_\_

A) domain: all real numbers  
range:  $\{y | y \leq 4\}$

B) domain:  $\{x | x \leq -3\}$   
range:  $\{y | y \leq 4\}$

C) domain: all real numbers  
range:  $\{y | y \leq -4\}$

D) domain:  $\{x | x \leq -3\}$   
range:  $\{y | y \leq -4\}$

Solve the problem.

28) The owner of a video store has determined that the profits  $P$  of the store are approximately given by  $P(x) = -x^2 + 150x + 63$ , where  $x$  is the number of videos rented daily. Find the maximum profit to the nearest dollar.

28) \_\_\_\_\_

A) \$11,250

B) \$5625

C) \$11,313

D) \$5688



29) The manufacturer of a CD player has found that the revenue  $R$  (in dollars) is  $R(p) = -5p^2 + 1730p$ , 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?

29) \_\_\_\_\_

A) \$598,580

B) \$299,290

C) \$149,645

D) \$1,197,160

Solve the inequality.

30)  $x^2 - 6x \geq 0$

30) \_\_\_\_\_

A)  $\{x \mid -6 \leq x \leq 0\}; [-6, 0]$

B)  $\{x \mid x \leq -6 \text{ or } x \geq 0\}; (-\infty, -6] \text{ or } [0, \infty)$

C)  $\{x \mid x \leq 0 \text{ or } x \geq 6\}; (-\infty, 0] \text{ or } [6, \infty)$

D)  $\{x \mid 0 \leq x \leq 6\}; [0, 6]$

State whether the function is a polynomial function or not. If it is, give its degree. If it is not, tell why not.

31)  $f(x) = \frac{4}{3} - \frac{1}{3}x$

31) \_\_\_\_\_

A) Yes; degree 0

B) Yes; degree 1

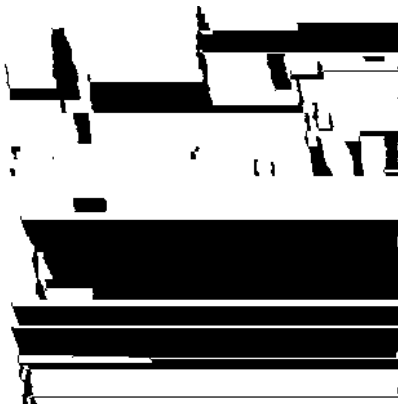
C) No;  $x$  has a fractional coefficient

D) Yes; degree 3

Use the graph to determine the domain and range of the function.

32)

32) \_\_\_\_\_



A) domain: all real numbers  
range: all real numbers

B) domain: all real numbers  
range:  $\{y \mid y \geq 0\}$

C) domain:  $\{x \mid x \geq 0\}$   
range: all real numbers

D) domain:  $\{x \mid x \geq 0\}$   
range:  $\{y \mid y \geq 0\}$

Graph the function.

33)  $f(x) = \frac{x^2 + x - 42}{x^2 - x - 30}$

33) \_\_\_\_\_

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C)

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B)

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D)

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Determine where the graph of  $f$  is below the graph of  $g$  by solving the inequality  $f(x) < g(x)$ .

34)  $f(x) = x^4 + 3$   
 $g(x) = x + 3$

34) \_\_\_\_\_

A)  $f(x) < g(x)$  if  $0 < x < 1$

B)  $f(x) < g(x)$  if  $x < -1$  or  $x \geq 1$

C)  $f(x) < g(x)$  if  $-1 < x < 1$

D)  $f(x) < g(x)$  if  $x < 0$  or  $x \geq 1$

Use the Factor Theorem to determine whether  $x - c$  is a factor of  $f(x)$ .

35)  $f(x) = x^4 + 10x^3 + 3x^2 + 22x - 80$ ;  $x + 10$

35) \_\_\_\_\_

A) Yes

B) No

Use the given zero to find the remaining zeros of the function.

36)  $f(x) = x^3 + 2x^2 - 6x + 8$ ; zero:  $1 + i$

36) \_\_\_\_\_

A)  $1 - i, 4$

B)  $1 - i, 4i$

C)  $1 - i, -4$

D)  $-4, 4$

Evaluate the expression using the values given in the table.

37)  $(fg)(4)$

37) \_\_\_\_\_

$x$	1	5	8	12
$f(x)$	-2	8	2	13

$x$	-5	-2	1	4
$g(x)$	1	-5	5	8

A) 5

B) 8

C) 2

D) Undefined

Indicate whether the function is one-to-one.

38)  $\{(-20, 19), (-8, 1), (-13, -15)\}$

38) \_\_\_\_\_

A) Yes

B) No

Solve the equation.

39)  $2^{1+2x} = 8$

39) \_\_\_\_\_

A)  $\{2\}$

B)  $\{4\}$

C)  $\{1\}$

D)  $\{-1\}$

The Richter scale converts seismographic readings into numbers for measuring the magnitude of an earthquake according to this function  $M(x) = \log \left( \frac{x}{x_0} \right)$ , where  $x_0 = 10^{-3}$ .

40) Find the magnitude (to one decimal place) of an earthquake whose seismographic reading is 2000 millimeters at a distance of 100 kilometers from its epicenter. Round the answer to the nearest tenth.

40) \_\_\_\_\_

A) 5.9

B) 6.3

C) 7.3

D) 6.4

Suppose that  $\ln 2 = a$  and  $\ln 5 = b$ . Use properties of logarithms to write each logarithm in terms of  $a$  and  $b$ .

41)  $\ln \sqrt[6]{20}$

A)  $\frac{1}{6}(2a + b)$

B)  $\frac{1}{3}(a + b)$

C)  $\frac{1}{6}(a^2 + b)$

D)  $\frac{1}{3}(a - b)$

41) \_\_\_\_\_

Solve the problem.

42)  $f(x) = \log_2(x - 5)$  and  $g(x) = \log_2(5x - 3)$ .

Solve  $f(x) + g(x) = 6$ .

A)  $\{-7\}$

B)  $\{128\}$

C)  $\{-128\}$

D)  $\{7\}$

42) \_\_\_\_\_

Determine whether the relation represents a function. If it is a function, state the domain and range.

43)  $\{(-3, 14), (-2, 9), (0, 5), (2, 9), (4, 21)\}$

A) function

domain:  $\{14, 9, 5, 21\}$

range:  $\{-3, -2, 0, 2, 4\}$

B) function

domain:  $\{-3, -2, 0, 2, 4\}$

range:  $\{14, 9, 5, 21\}$

C) not a function

43) \_\_\_\_\_

Find the value for the function.

44) Find  $-f(x)$  when  $f(x) = |x| + 3$ .

A)  $|-x| + 3$

B)  $-|x| + 3$

C)  $-|x| - 3$

D)  $|-x| - 3$

44) \_\_\_\_\_

Find the domain of the function.

45)  $f(x) = 8x + 6$

A)  $\{x | x \leq 0\}$

B) all real numbers

C)  $\{x | x > 0\}$

D)  $\{x | x \geq -6\}$

45) \_\_\_\_\_

Answer the question about the given function.

46) Given the function  $f(x) = 2x^2 + 4x + 2$ , list the  $y$ -intercept, if there is one, of the graph of  $f$ .

A) 6

B) 0

C) 2

D) 8

46) \_\_\_\_\_

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

47)



A) even

B) odd

C) neither

47) \_\_\_\_\_

The graph of a function is given. Determine whether the function is increasing, decreasing, or constant on the given interval.

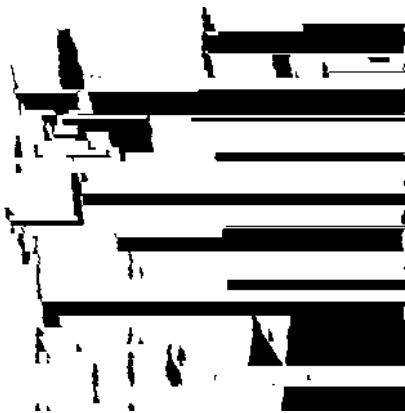
48)  $(-2.5, -1)$  48) \_\_\_\_\_



- A) increasing                      B) constant                      C) decreasing

Graph the function.

49)  $f(x) = \sqrt{x}$  49) \_\_\_\_\_



A)



B)



C)



D)



Suppose the point  $(2, 4)$  is on the graph of  $y = f(x)$ . Find a point on the graph of the given function.

50) The reflection of the graph of  $y = f(x)$  across the  $x$ -axis

A)  $(-2, -4)$

B)  $(2, 4)$

C)  $(-2, 4)$

D)  $(2, -4)$

50) \_\_\_\_\_