Name: _____

2) _____

$23, 0, \dfrac{0}{8}, \quad 9, \dfrac{-6}{0}, 0.51$

A) $\sqrt{7}, \sqrt{9}, 0.51$ B) $\sqrt{7}, \sqrt{9}$ C) $\sqrt{7}$ D) $\sqrt{7}, \dfrac{-6}{0}$

Write the number in scientific notation.

3) 4,200,000

3) _____

A) 4.2×10^5 B) 4.2×10^6 C) 4.2×10^{-6} D) 4.2×10^{-5}

4) 0.000977

4) _____

A) 9.77×10^4 B) 9.77×10^{-4} C) 9.77×10^{-5} D) 9.77×10^{-3}

Use a calculator to approximate the expression. Write your answer in scientific notation, and round to the nearest tenth as needed.

5) $(2.2 \times 10^5)(1.6 \times 10^7)$

5) _____

A) 35×10^{12} B) 3.5×10^{35} C) 35×10^{35} D) 3.5×10^{12}

6) $\dfrac{5.5 \times 10^6}{0.0096}$

6) _____

A) 6.1×10^8 B) 5.7×10^8 C) 5.7×10^6 D) 5.3×10^6

Find the domain and range of the relation.

7) {(- 1,9), (5,- 5), (- 6,- 9), (2,- 3), (- 8,- 7)}

7) _____

A) D = {- 7, - 5, - 9, - 3, 9}; R = {- 8, 5, - 6, 2, - 1}
B) D = {- 8, 5, - 6, 2, - 1}; R = {- 7, - 5, - 9, - 3, 9}
C) D = {- 9, 2, - 3, - 1, 9}; R = {- 8, - 7, 5, - 5, - 6}
D) D = {- 8, - 7, 5, - 5, - 6}; R = {- 9, 2, - 3, - 1, 9}

Find the median of the set of data.

10) 7, 9, 15, 24, 41, 45, 46

10) _____

20) $f(x) = x^3 - 4x$, $x_1 = 2$ and $x_2 = 4$
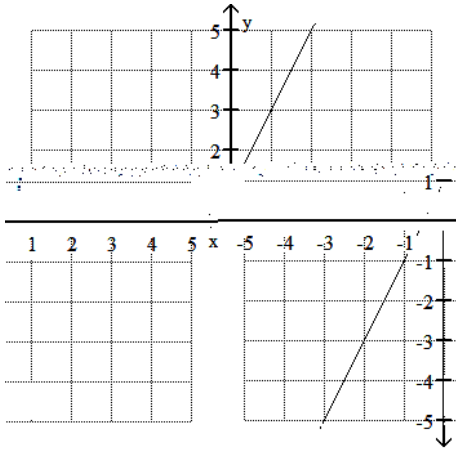
    A) - 8   B) - 24   C) 8   D) 24

20) _____

Identify the slope, y -intercept, and x -intercept.

21)

21) _____

A) Slope: 3; y- intercept: 1; x- intercept: $-\dfrac{1}{2}$

B) Slope: - 2; y- intercept: $-\dfrac{1}{2}$; x- intercept: 1

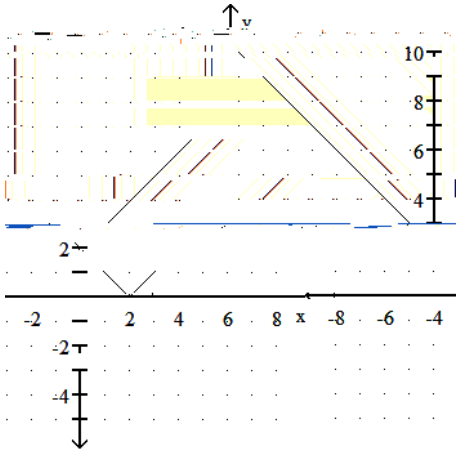C) Slope: 2; y- intercept: $-\dfrac{1}{2}$; x- intercept: 1

D) Slope: 2; y- intercept: 1; x- intercept: $-\dfrac{1}{2}$

Use the graph of f to determine the intervals where f is increasing and where f is decreasing.
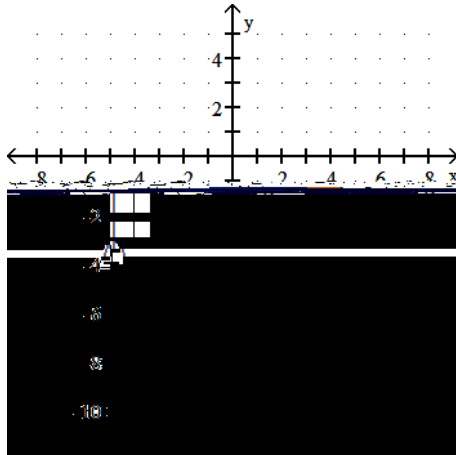
22)

22) _____

A) increasing: (,); decreasing: never

B) increasing: (, 0); decreasing (0,)

C) increasing: (2,); decreasing (, 2)

D) increasing: (, 2); decreasing (2,)

3

23)   23) _____

A) increasing: (, 0); decreasing (0,)   B) increasing: never; decreasing: (,)
C) increasing: (,); decreasing: never   D) increasing: (0,); decreasing (, 0)

Find a point -
   24) Slope - 5, passing through (6, 3)   24) _____
      A) y - 3 = 5x - 6   B) y - 3 = - 5x + 6   C) y = - 5(x - 6) - 3   D) y = - 5(x - 6) + 3

Write the slope -intercept form of the equation for the line passing through the given pair of points.
   25) (- 8, 7) and (0, 2)   25) _____
      A) $y = -\frac{5}{8}x + 2$ B) $y = \frac{15}{2}x + 2$ C) $y = -\frac{15}{2}x + 2$ D) $y = \frac{5}{8}x + 2$

Write an equation of the line through the given point with the given slope. Write the equation in slope   -
   26) (3, 3); slope: - 6   26) _____
      A) y = - 6x - 21   B) y = - 6x + 21   C) $y = -6x + \frac{1}{21}$ D) $y = -\frac{1}{6}x + 21$

Find an equation of the line satisfying the following conditions.
If possible, write the equation in slope   -intercept form.
   27) Through (4, - 3), parallel to - 6x + 5y = - 49   27) _____
      A) $y = \frac{5}{6}x + \frac{1}{2}$ B) $y = -\frac{4}{5}x - \frac{49}{5}$

Solve the problem using your calculator.

30) Ten students in a graduate program were randomly selected. Their grade point averages (GPAs)   30) _____

regarding their GPAs on entering the program versus their current GPAs. Use linear regression to find a linear function that predicts a student's current GPA as a function of his or her entering GPA.

Entering GPA	Current GPA
3.5	3.6
3.8	3.7
3.6	3.9
3.6	3.6
3.5	3.9
3.9	3.8
4.0	3.7
3.9	3.9
3.5	3.8
3.7	4.0

A) $y = 5.81 + 0.497x$ B) $y = 4.91 + 0.0212x$
C) $y = 2.51 + 0.329x$ D) $y = 3.67 + 0.0313x$

31) The paired data below consist of the test scores of 6 randomly selected students and the number of   31) _____
hours they studied for the test. Use linear regression to find a linear function that predicts a student's score as a function of the number of hours he or she studied.

Hours	5	10	4	6	10	9
Score	64	86	69	86	59	87

A) $y = 33.7 - 2.14x$ B) $y = -67.3 + 1.07x$
C) $y = 67.3 + 1.07x$ D) $y = 33.7 + 2.14x$

$$ax + b = 0.$$

32) $7x + 7 = 0.8$ 32) _____
   A) Nonlinear   B) Linear

Solve the equation symbolically.

33) $23t + 6 = 7t + 12$ 33) _____

   A) $\dfrac{3}{8}$ B) $\dfrac{5}{3}$ C) $-\dfrac{3}{8}$ D) $\dfrac{15}{7}$

34) $8x - (6x - 1) = 2$ 34) _____

   A) $\dfrac{1}{2}$ B) $\dfrac{1}{14}$ C) $-\dfrac{1}{14}$ D) $-\dfrac{1}{2}$

$$ax + b = 0.$$

35) $x^2 + 3x = x^3 + 6$

Solve the equation symbolically.

36) $\dfrac{3x - 9}{5} + \dfrac{6x - 8}{4} = -1$　　　　　　　　　　　　　　　　　36) _____

　　　A) $-\dfrac{4}{7}$　　　　　　B) $\dfrac{4}{3}$　　　　　　C) $-\dfrac{16}{7}$　　　　　　D) $\dfrac{25}{14}$

Classify the equation as a contradiction, an identity, or a conditional equation.

37) $15k - 48 = 5(3k - 10)$

Identify f as being linear, quadratic, or neither. If f is quadratic, identify the leading coefficient.

46) $f(x) = 3x^2 - 8$

    A) Linear   B) Quadratic; - 8   C) Quadratic; 3   D) Neither

46) _____

47) $f(x) = \dfrac{6}{2x^2 + 9}$

    A) Linear   B) Quadratic; 2   C) Quadratic; 6   D) Neither

47) _____

Determine the vertex of the graph of f.

48) $f(x) = 2x^2 + 12x + 14$

    A) (- 4, - 3)   B) (4, 3)   C) (3, 4)   D) (- 3, - 4)

48) _____

49) $f(x) = 4x^2 - 24x + 41$

    A) (5, 3)   B) (- 3, - 5)   C) (3, 5)   D) (- 5, - 3)

49) _____

Write the equation as $f(x) = a(x - h)^2 + k$. Identify the vertex.

50) $f(x) = x^2 + 6x - 4$

    A) $f(x) = (x + 6)^2 - 40; (- 40, - 6)$ B) $f(x) = (x + 3)^2 - 13; (- 13, - 3)$

    C) $f(x) = (x + 6)^2 - 40; (- 6, - 40)$ D) $f(x) = (x + 3)^2 - 13; (- 3, - 13)$

50) _____

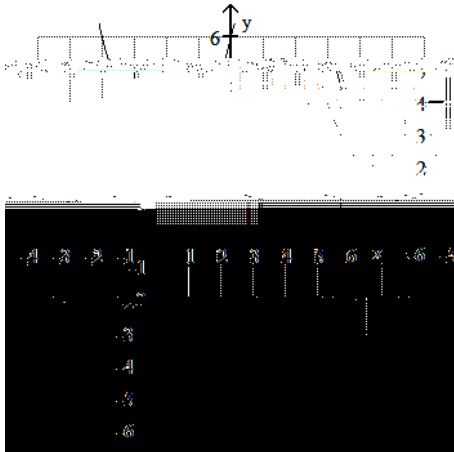51) $f(x) = x^2 + 5x + 2$

    A) $f(x) = (x + 5)^2 - 23; (- 5, 23)$ B) $f(x) = \left(x + \dfrac{5}{2}\right)^2 - \dfrac{17}{4}; \left(\dfrac{5}{2}, - \dfrac{17}{4}\right)$

    C) $f(x) = \left(x + \dfrac{5}{2}\right)^2 - \dfrac{17}{4}; \left(- \dfrac{5}{2}, - \dfrac{17}{4}\right)$ D) $f(x) = (x + 5)^2 - 23; (5, 23)$

51) _____

Use the graph of the quadratic function to determine the sign of the leading coefficient, the vertex, and the equation of the axis of symmetry.
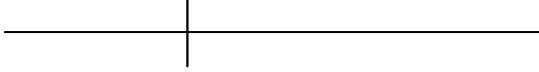
52)

    A) Positive; (- 2, 2); x = - 2   B) Positive; (- 2, 2); y = 2

    C) Negative; (- 2, 2); x = - 2   D) Positive; (2, 2); x = 2

52) _____

Solve the problem.

53)

63)

$s = 16t^2 + 32t$, where s is in feet. How long (to the nearest tenth) will it take the ball to fall 181 feet?
   A) 3.4 sec   B) 2.5 sec   C) 6.3 sec   D) 2.3 sec

If the following is a polynomial function, then state its degree and leading coefficient. If it is not, then state this fact.

64) $f(x) = 16x^7 - 4x - 6$

   A) Degree: 16; leading coefficient: 7   B) Degree: 7; leading coefficient: 16
   C) Not a polynomial function.   D) Degree: 8; leading coefficient: 16

65) $f(x) = -9x^4 + 7x^3 + 3x^2 + 9$

   A) Degree: -9; leading coefficient: 3   B) Degree: 3; leading coefficient: -9
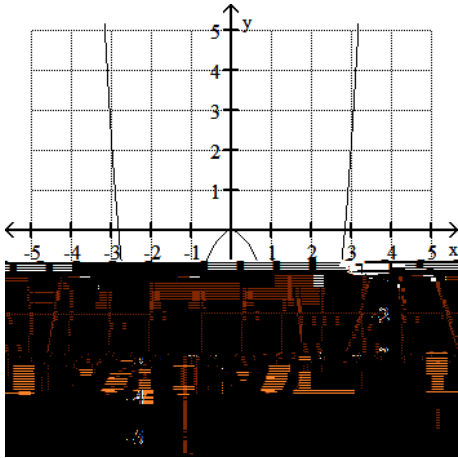   C) Not a polynomial function.   D) Degree: 4; leading coefficient: -9

Determine any local or absolute extrema as indicated.

66) Use the graph of f to estimate the local extrema.

   A) Local maximum: 0; Absolute minima: -2 and 2
   B) Local maximum: 0; Absolute minimum: -4
   C) No absolute maximum; Absolute minimum: -4
   D) Local maximum: ; Absolute minima: -2 and 2

67) Estimate graphically the local extrema of $f(x) = 0.02x^5 - 0.04x^4 - 0.06x^3 + 1.46x^2 + 1$.

   A) Local maximum: 7.86; local minimum: 1
   B) Local maximum: 9.20; local minimum: 1.06
   C) Local maximum: -2.79; local minimum: 0
   D) Local maximum: 8.65; local minimum 0.91

State the end behavior of the graph of f.

68) $f(x) = 4x - \frac{1}{2}x^3$

   A) Down on both sides   B) Up on left side, down on right side
   C) Down on left side, up on right side   D) Up on both sides

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

   A) Up on both sides   B) Up on left side, down on right side
   C) Down on both sides   D) Down on left side, up on right side

Approximate the coordinates of each turning point. Round to the nearest hundredth, if necessary.

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

    A) (2, 12)   B) (-2, 4)   C) (2, 4)   D) (-2, 12)

70) _____

71) $f(x) = x^4 - 4x^3 + 4x^2 - 4x + 1$

    A) (2.32, -7.73)   B) (0, 1)

    C) (0.23, 0.25) and (2.73, 5.95)   D) (2.73, -5.95)

71) _____

82) 6 ln x - 6 =

82) _____

    A) x = 7 .57   B) x = 0.77   C) x = 8.73   D) x = 0.43

Solve the equation symbolically.

83) $\log_2 x = 3$

83) _____

    A) x = 9   B) x = 8   C) x = 6   D) x = 1.89

Use the change of base formula to approximate the logarithm to four decimal places.

84) $\log_8 47.35$

84) _____

    A) 1.6753   B) 1.8551   C) 5.9188   D) 0.5391

85) $\log_{8.8} 2.3$

85) _____

    A) 0.3830   B) 0.2614   C) 0.3617   D) 2.6110

86) $\log_{\sqrt{4}} 293.2$

86) _____

    A) 4.0979   B) 8.1957   C) 0.3010   D) 0.1220

Use common or natural logarithms to solve the exponential equation .

87) $4^{(12 - 3x)} = 64$

87) _____

    A) x = - 15   B) x = 12.33   C) x = - 1   D) x = 3

88) $3^{(x - 1)} = 17$

88) _____

    A) x = - 0.61   B) x = 3.58   C) x = - 3.58   D) x = 1.39

89) $5^x = \dfrac{1}{625}$

89) _____

    A) x = - T   B) x = 0.22   C) x = ᴛᴍᴛᴛ   D)
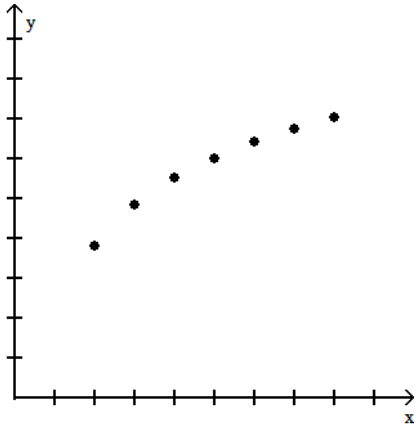
Select an appropriate type of modeling function for the data shown in the graph. Choose from exponential, logarithmic, and logistic.

92)

92) _____

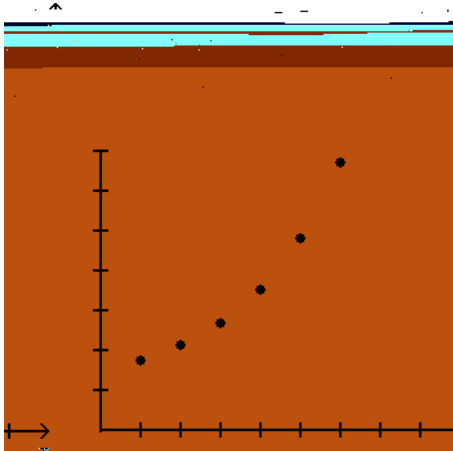A) Logarithmic   B) Logistic   C) Exponential

93)

93) _____

A) Logarithmic   B) Exponential   C) Logistic

Solve the problem.

94) The table contains data that can be modeled by an exponential function of the form $f(x) = ba^x$. Use regression to determine an exponential function f that models this data. Round the coefficients to the nearest hundredth.

94) _____

x	1	3	5	7
y	1.23	2.51	4.05	6.92

A) $f(x) = (0.85)(1.14)^x$ B) $f(x) = (0.98)(1.33)^x$

C) $f(x) = (1.14)(0.85)^x$ D) $f(x) = (1.33)(0.98)^x$

Round function values to the nearest hundredth.

95)

x	1	2	3	4	5
y	1.3	4.9	6.8	8.0	9.2

95) _____
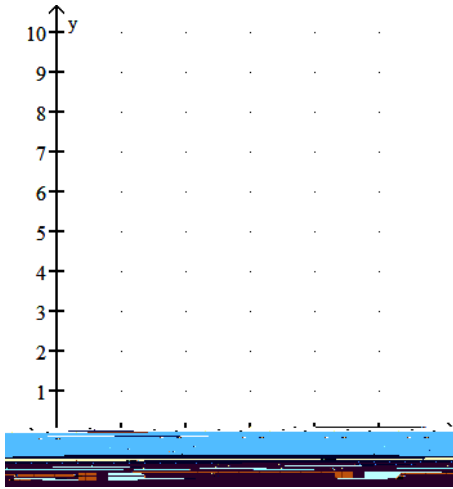
A) Logarithmic: $f(x) = 1.29 + 5.19 \ln x$

B) Logistic: $f(x) = \dfrac{6.96}{1 + 500.14e^{-2.25x}}$

C) Logarithmic: $f(x) = 1.39 + 4.86 \ln x$

D) Logistic: $f(x) = \dfrac{8.94}{1 + 16.33e^{-1.38x}}$

1) D
2) C
3) B
4) B
5) D
6) B
7) B
8) A
9) A
10) D
11) A
12) B
13) A
14) A
15) D
16) A
17) B
18) A
19) B
20) D
21) D
22) C
23) A
24) D
25) A
26) B
27) D
28) B
29) C
30) D
31) C
32) B
33) A
34) A
35) B
36) B
37) A
38) A
39) C
40) B
41) A
42) B
43) A
44) C
45) A
46) C 4 B   105   Ca

51) C
52) A
53) B
54) A
55) A
56) D
57) C
58) D
59) A
60) C
61) B
62) B
63) B
64) B
65) D
66) B
67) A
68) B
69) A
70) C
71) A
72) D
73) B
74) C
75) C
76) A
77) A
78) A
79) A
80) C

82) C
83) B
84) B
85) A
86) B
87) D
88) B
89) A
90) D
91) B
92) A
93) B
94) B
95) C