FINAL REVIEW WORKSHEET
COLLEGE ALGEBRA

Chapter 1.

1. *Given the following equations, which are functions?*

    (A) $y^2 = 1 - x^2$ **(B)** $y = 9$ **(C)** $y = x^3 - 5x$

    (D) $5x + 2y = -10$ **(E)** $y = \pm\sqrt{1 - 2x}$ **(F)** $y = \frac{3}{x} + 5$

    a. *all of the above*   **b.** *none of the above*   **c.** *B, C, D, and F*

    d. *C, D, F*   **e.** *C only*   **f.** *C and F*

2. *Given* $f(x) = \frac{x^2-1}{x+4}$, *find* $f(-3)$.

    a. -10 **b.** 10 **c.** -8 **d.** 8 **e.** $\frac{8}{7}$

3. *Given* $f(x) = \frac{x^2+3}{x-5}$, *find* $f(\frac{1}{4})$

    a. $\frac{49}{76}$ **b.** $-\frac{49}{76}$ **c.** $-\frac{47}{84}$ **d.** $\frac{47}{84}$

4. *What is the domain of this function:* $f(x) = \sqrt{x^2 - x - 2}$

    a. $(-\infty, -1] \cup [2, \infty)$ **b.** $(\infty, -2] \cup [1, \infty)$ **c.** $(-2, 1)$ **d.** $[-1, 2]$

5. *What is the domain of this function:* $f(x) = \frac{3-x}{x+5}$

    a. $(-\infty, -5) \cup (3, \infty)$ **b.** $x \neq -5, x \neq 3$ **c.** $x \neq -5$ **d.** $(-5, 3)$

6. *What is the range of this function:* $y = x^2 - 5$

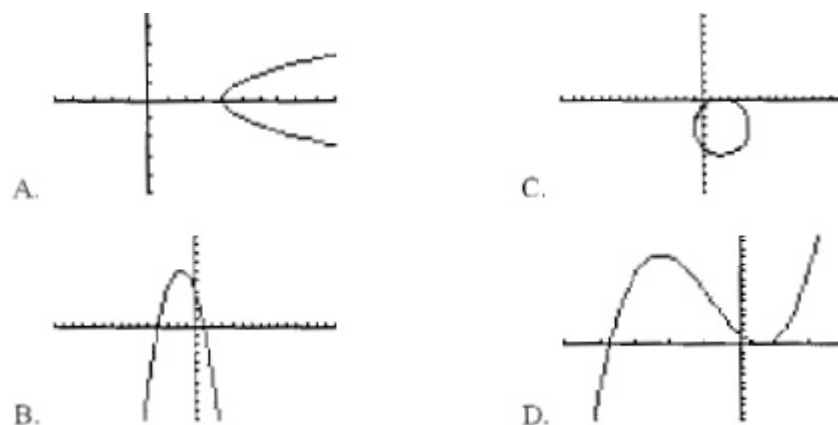   **a.** $(-\infty, \infty)$ **b.** $[5, \infty)$ **c.** $[-5, \infty)$ **d.** $(-\infty, -5]$

A.

C.

B.

D.

FIGURE 1

7. *Determine which of the following graphs in Figure (1) is the graph of a function.*

  a. *A only*

  b. *B only*

  c. *B and D*

  d. *all of these are fuctions*

  e. *none of these are functions*

8. *Find the x- and y- intercepts of $4x - 5y + 20 = 0$.*

  a. $y = -12$ **b.** $y = 12$ **c.** $y = \frac{3}{8}$ **d.** $y = \frac{8}{3}$

9. *Given the line $2y = 3x - 6$, what is the slope and y-intercept?*

  a. $m = 3, y - int. = -6$ **b.** $m = 3, y - int. = 2$

  c. $m = \frac{3}{2}, y - int. = -6$ **d.** $m = \frac{3}{2}, y - int. = -3$

10. *Find the equation of the line perpendicular to* $x - 2y + 5 = 0$ *passing through* $(0, 4)$.

    a. $y = \frac{1}{2}(x - 5)$ **b.** $y = 2x + 4$ **c.** $y = -\frac{1}{2}x + \frac{5}{2}$ **d.** $y = -2x + 4$

11. *Find the equation of a line through the points* $(3, 2)$ *and* $(-3, 6)$.

    a. $2x + 3y = 12$ **b.** $3x + 2y = -12$ **c.** $-3x + 2y = 4$ **d.** $-2x - 3y = 4$

12. *Find the equation of a line with x-intercept=2 and y-intercept=-1.*

    a. $y = -\frac{1}{2}x - 1$ **b.** $y = -2x - 1$ **c.** $y = \frac{1}{2}x - 1$ **d.** $y = -2x + 1$

13. *Given the line:* $3x + 2y = 7$, *which of the following line is perpendicular to this line.*

    a. $y = \frac{3}{2}x + 4$ **b.** $y = -\frac{2}{3}x - 4$ **c.** $y = \frac{2}{3}x + 3$ **d.** $y = -\frac{2}{3}x + 5$

14. *Find the equation of a line through the point* $(2, 1)$ *and parallel to the line* $5x - 2y = 7$.

    a. $2x - 5y = 8$ **b.** $5x - 2y = 8$ **c.** $5x + 2y = -4$ **d.** $-2x + 5y = 4$
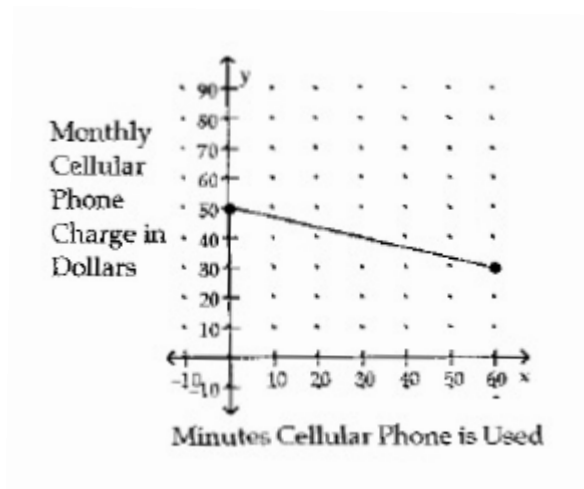
15. *Find the rate of change in the following graph:*

FIGURE 2

a. $0.33 *per minute*   **b.** $$ - 0.33$ *per minute*

c. $1.00 *per minute*   **d.** $$ - 3.00$ *per minute*

16. *The paired data below consists of the costs of advertising (in thousands of dollars) and the number of products sold (in thousands). Use linear regression to find the function that predicts the number of products sold as a function of the cost of advertising.*

Cost	9	2	3	4	2	5	9	10
Number	85	52	55	68	67	86	83	73

a. $y = 2.79x + 55.8$ **b.** $y = -1.42x - 26.4$

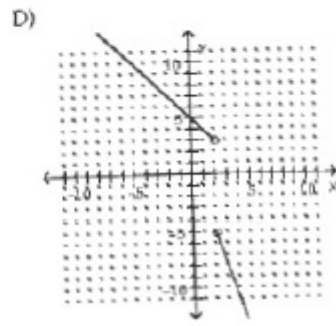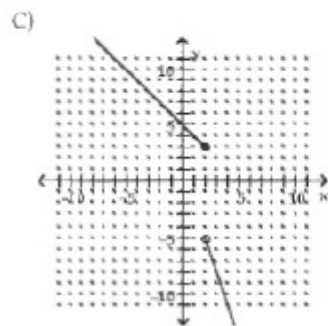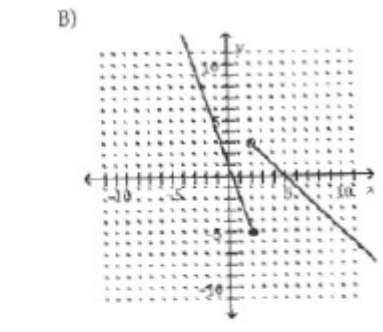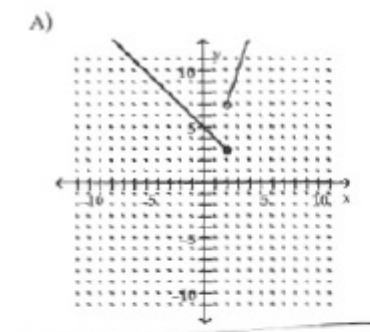**c.** $y = 1.42x + 26.4$ **d.** $y = -2.79x + 55.8$

17. *Establish where the following function in Figure (3) is increasing, decreasing, or constant.*

   a. *Increasing on* $(-\infty, 0)$, *decreasing on* $(0, \infty)$ **b.** *Increasing on* $(0, \infty)$, *decreasing on* $(-\infty, 0)$

   c. *Increasing on* $(-\infty, 3)$, *decreasing on* $(3, \infty)$ **d.** *Increasing on* $(3, \infty)$, *decreasing on* $(-\infty, 3)$

18. *Graph the piecewise function*

$$f(x) = \begin{cases} 5 - x, & \text{for } x \le 2 \\ 1 - 3x, & \text{for } x > 2 \end{cases}$$

A)

B)

C)

D)

19. *For the function* $f(x) = 3x^2 - 2x + 5$, *find* $f(2x - 3)$

    a. $4x^2 - 12x + 20$ **b.** $12x^2 + 40x + 16$ **c.** $3x^2 + 2$ **d.** $12x^2 - 40x + 38$

20. *If a graph is symmetric with respect to the y-axis and the point* $(2, 4)$ *is on the graph, then what point is also on the graph?*

    a. $(-2, 4)$ **b.** $(3, 4)$ **c.** $(2, -4)$ **d.** $(-2, -4)$

21. *The graph:* $x + y^2 + 10 = 0$ *is symmetric with respect to which axis:*

    a. $x - axis$ **b.** $y - axis$ **c.** $x - axis$ *and* $y - axis$ **d.** *no symmentries*

22. *Determine if* $y = x^3 - x$ *is even, odd, or neither even nor odd.*

    a *even*   **b** *odd*   **c** *neiher*

23. *The graph of* $y = |x|$ *is shifted to the right 4 units and reflected across the x-axis. Write the equation of the new function.*

    a. $y = |x| + 4$ **b.** $y = -|x + 4|$ **c.** $y = -|x| + 4$ **d.** $y = -|x - 4|$

24. *y varies directly as* x^2 *and inversely as z; y=4 when x=4 and z=2. Find y when x=2 and z=4.*

    a. $y = 2$ **b.** $y = \frac{1}{2}$ **c.** $y = -2$ **d.** $y = 10$

25. *The velocity v of a falling object is directly proportional to the time t of the fall. If, after 2 seconds, the velocity is 64 ft sec. What is the velocity after 5 sec.*

    a. 26.4 *ft* sec   **b.** 160 *ft* sec   **c.** $\frac{5}{32}$ *ft* sec   **d.** 1600 *ft* sec

26. *The perimeter of a rectangle is 3 feet. Express its area A as a function of the length x of a side.*

    a. $A(x) = x(1 - x)$ **b.** $A(x) = 1.5 - x$

    c. $A(x) = x(x - 3)$ **d.** $A(x) = x(1.5 - x)$

27. *The volume of a right circular cylinder of height h and radius r is $V = \pi r^2 h$. If the height is three times the radius, express the volume V as a function of r.*

    a. $V(r) = 3\pi r^2 h$ **b.** $V(r) = 3\pi r^3$ **c.** $V(r) = 3\pi h^3$ **d.** $V(r) = 9\pi h^3$

28. *Find the midpoint of a line segment from $(-6, 0)$ and $(2, -4)$.*

    a. $M = (-2, -2)$ **b.** $M = (-3, -4)$ **c.** $M = -1, -3)$ **d.** $M = (0, -1)$

29. *Find the distance between $(-2, 5)$ and $(3, 4)$.*

    a. $d = \sqrt{26}$ **b.** $d = \sqrt{58}$ **c.** $d = -\frac{1}{5}$ **d.** $d = \sqrt{29}$

30. *Given the circle with center $(2, -5)$ and radius of 4. What is the equation of the circle.*

    a. $x^2 - y^2 + 4x - 10y = -13$ **b.** $x^2 + y^2 + 4x - 10y = -13$

    c. $x^2 + y^2 + 4x + 10y = 45$ **d.** $x^2 + y^2 - 4x + 10y = -13$

31. *What is the center of circle: $x^2 + y^2 + 2x - 6y + 9 = 0$*

    a. $(1, 3)$ **b.** $(-2, 6)$ **c.** $(-1, 3)$ **d.** $(2, 3)$

Chapter 2.

32. *Solve the equation: $\frac{1}{5}(p + 5) - 3 = \frac{1}{6}(2p - 5)$*
    a. $p = 7.4$ **b.** $p = -8.75$ **c.** $p = 9.25$ **d.** $p = -8.1667$

33. *Solve for t_2:* $S = \frac{A}{r(t_1 - t_2)}$

    a. $srt_1 - A$ **b.** $\frac{Srt_1 - A}{Sr}$ **c.** $t_1 - A$ **d.** $\frac{A - Srt_1}{Sr}$

34. *Mani pays $135.45 for a new bike. If the price paid includes a 7.5% sales tax, which is the price of the bike itself?*

    a. $119.50   **b.** $122.80   **c.** $123.00   **d.** $126.00

35. *Multiply:* $(4 - i)^2$

    a. $17 - 4i$ **b.** $16 + 2i$ **c.** $15 - 8i$ **d.** $17 - 8i$

36. *Divide:* $\frac{4 - 3i}{2 + 5i}$

    a. $\frac{23}{29} - \frac{28}{29}i$ **b.** $-\frac{7}{29} - \frac{26}{29}i$ **c.** $-\frac{7}{29} + \frac{14}{29}i$ **d.** $\frac{1}{3}$

37. *Find the value of* i^{50}

    a. -1 **b.** 1 **c.** $-i$ **d.** i

38. *Solve* $3x^2 - 10x + 5 = 0$. *Simplify your answer.*

    a. $\frac{5 \pm \sqrt{10}}{3}$ **b.** $\frac{5 \pm \sqrt{17}}{3}$ **c.** $\frac{10 \pm \sqrt{10}}{3}$ **d.** $5 \pm \sqrt{10}$

39. *Solve in the complex number system:* $x^2 + 3 = x$

    a. $\frac{1 \pm \sqrt{11}i}{2}$ **b.** $\frac{1 \pm \sqrt{11}}{2}$ **c.** $\frac{1 \pm \sqrt{17}i}{2}$ **d.** $\frac{-3 \pm \sqrt{3}i}{2}$

40. *Use a calculator to solve the equation, correct to two decimal places:* $2x^2 + x - 2 = 0$.

    a. $x = 0.78$ *and* $x = -1.28$ **b.** $x = 1.28$ *and* $x = -0.78$

    c. $x = 5.28$ *and* $x = 8.92$ **d.** $x = 1.78$ *and* $x = -3.28$

41. *Find the real solutions of the equation:* $x + 3\sqrt{x} - 10 = 0$

    a. $x = 25$ **b.** $x = 4$ **c.** $x = \{-5, 2\}$ **d.** $x = \{-4, 4\}$

42. *Solve the following:* $3x^{-2} - 7x - 6 = 0$

    a. $x = \{-2, 6\}$ **b.** $x = \{-\frac{3}{2}, \frac{1}{3}\}$ **c.** $x = \{-\frac{2}{3}, 3\}$ **d.** $x = \{-\frac{2}{3}, 3\}$

43. *John owns a hotdog stand. He has found that his profit is represented by the equation* $P(x) = -x^2 + 76x + 88$*, with P being the profit and x the number of hotdogs sold. How many hotdogs must he sell to earn the most profit?*

    a. 38 *hotdogs* **b.** 39 *hotdogs* **c.** 50 *hotdogs*   **d.** 25 *hotdogs*

44. *Find the vertex of this parabola:* $f(x) = -x^2 + 2x + 8$

    a. $(-1, 8)$ **b.** $(9, 1)$ **c.** $(2, 8)$ **d.** $(1, 9)$

45. *Does the parabola above:*

    a *Open up* **b** *Open down*

46. *Find the line of symmetry of the given function* $y = 2x^2 - 8x + 4$

    a. $x = -4$ **b.** $x = 2$ **c.** $x = 4$ **d.** $x = -2$

47. *Match the equation to the correct graph:* $y = 2(x+1)^2 - 2$

a.

c.

b.

d.
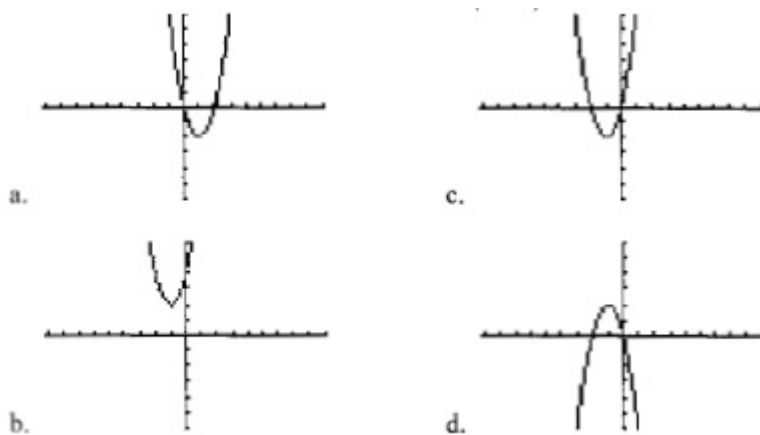
48. *Solve the following:* $\frac{3}{x-2} = \frac{1}{x-1} + \frac{7}{(x-1)(x-2)}$

   a. *no solution*   **b.** $x = -4$ **c.** $x = 3$ **d.** $x = 4$

49. *Solve the following:* $\sqrt{12 - x} = x$

   a. $x = 6$ **b.** $x = -6$ **c.** $x = 3$ **d.** $x = \{-3, 4\}$ **e.** $x = \{-4, 3\}$

50. *Solve:* $|3m - 1| = 6$

   a. $\frac{7}{3}$ **b.** $-\frac{7}{3}, \frac{7}{3}$ **c.** $-\frac{5}{3}, \frac{7}{3}$ **d.** $-\frac{5}{3}$

51. *Solve the inequality:* $-32 \le \frac{32 - 4x}{8} \le 32$

   a. $[-56, 72]$ **b.** $[0, 16]$ **c.** $[-72, -56]$ **d.** $[-16, 0]$

52. *Solve the inequality:* $|32 - 4x| < 32$

   a. $(-64, 0)$ **b.** $[-64, 0]$ **c.** $[0, 16]$ **d.** $(0, 16)$

Chapter 3.

53. *Find the polynomial: $f(x) = x^2(x - 4)$, find the x- and y- intercepts of the graph of f.*

  a. $y - intercept = 0$, *and* $x - intercept = 0$

  b. $y - intercept = 0$, *and* $x - intercepts = 0, 4$

  c. $y - intercept = 0$, *and* $x - intercept = 4$

  d. $y - intercept = 0$, *and* $x - intercept = 0$

  e. *none of these*

54. *Given the following functions, which are polynomial function?*

  (A) $f(x) = 4x^3 - 3x^2$ **(B)** $f(x) = \frac{1}{2}x^4$ **(C)** $f(x) = \sqrt{x}(x - 7)$

  (D) $f(x) = x^{-3} + 3x^{-2} - 5x^{-1}$ **(E)** $f(x) = \frac{x^2 - 5}{x^4}$

  a. *all of the above*   **b.** *A only*   **c.** *A and C*

  d. *B only*   **e.** *A and B*   **f.** *none of the above*

55. *Use long division to divide $2x^3 + x^2 - 3x + 2$ by $x + 3$. Give the answer in the form $d(x) \cdot Q(x) + R(x)$, where $d(x)$ is the divisor, $Q(x)$ is the quotient and $R(x)$ is the remainder.*

  a. $(x + 3) \cdot (2x^2 - 5x + 12) - 34$ **b.** $(x + 3) \cdot (2x^2 - 5x + 12) + 34$

  c. $(x + 3) \cdot (2x^2 - 5x - 12) - 34$ **d.** $(x + 3) \cdot (2x^2 + 7x + 6) + 8$

56. *Use synthetic division to find $f(2)$, if $f(x) = 5x^4 - 2x^3 + x + 1$*

  a. 35   **b.** 29   **c.** 67   **d.** 95

57. *Use synthetic division to find the quotient and remainder for the following problem:* $(x^3 - 5) \div (x - 1)$

    a. $Q(x) = x^2 + x + 1$; $R(x) = -4$ **b.** $Q(x) = x^2 + x + 1$; $R(x) = 5$

    c. $Q(x) = x^2 - x - 1$; $R(x) = 0$ **d.** $Q(x) = x^3 - x^2 - x - 1$; $R(x) = 0$

58. *Use synthetic division to determine if* $x - 3$ *is a factor of*
$f(x) = 2x^5 - 4x^4 - 4x^3 - x + 3$

    a *yes*   **b** *no*

59. *Find the real solutions of the equation:* $x^3 - 2x^2 - 64x + 128 = 0$

    a. $x = \{-8, 2, 8\}$ **b.** $x = \{2, 8\}$ **c.** $x = \{-8, 0, 2, 8\}$ **d.** $x = \{-8, 8\}$

60. *Find the zeros of the polynomial function and state the multiplicity of*
$f(x) = -6x^2(x - 9)(x + 3)^3$

    a. -3 *multiplicity 3; 0 multiplicity 2; 3 multiplicity 1; 9 multiplicity 1*

    b. -3 *multiplicity 3; 9 multiplicity 1*

    c. -3 *multiplicity 1; 3 multiplicity 1; 9 multiplicity 1*

    d. -3 *multiplicity 3; 0 multiplicity 2; 9 multiplicity 1*

61. *Find a polynomial of degree 3 with 2, 2i, -2i, as zeros*

    a. $f(x) = x^3 - 2x^2 + 4x - 8$ **b.** $f(x) = x^3 - 2x^2 - 4x + 8$

    c. $f(x) = x^3 + 2x^2 + 4ix + 8i$ **d.** $f(x) = x^3 - 2ix^2 + 4x + 8$

62. *Given the polynomial function f(x), find the rational zeros and then the other zeros (that is, solve the equation f(x)=0)* $f(x) = 3x^4 - 20x^3 + 44x^2 - 80x + 128$

    a. $\{-\frac{8}{3}, -4, 2i, -2i\}$ **b.** $\{\frac{8}{3}, 4, i, -i\}$

    c. $\{\frac{8}{3}, 4, 2i, -2i\}$ **d.** $\{\frac{4}{3}, 4, 4i, -4i\}$

63. *What kind of asymptotes does this graph have?* $R(x) = \frac{3x^2+x-4}{x^2-4}$

    a. *horizontal asymptotes*

    b. *horizontal and vertical asymptotes*

    c. *horizontal, vertical, and oblique asymptotes*

    d. *horizontal and oblique asymptotesno asymptotes*

64. *Find the horizontal or oblique asymptotes, if any of the graph of* $R(x) = \frac{36x^2-x+8}{4x^2-8}$

    a. $y = 9$ **b.** $x = 9$ **c.** *none of these*   **d.** $y = -9$ **e.** $x = -9$

65. *Solve:* $x^2 + 7x - 18 > 0$

    a. $(-\infty, 9)$ **b.** $x \neq -9, x \neq 2$ **c.** $(-\infty, -9) \cup (2, \infty)$ **d.** $(-\infty, -2) \cup (9, \infty)$

66. *Solve:* $\frac{x-6}{x+1} \geq 3$

    a. $\left[-\frac{9}{2}, \infty\right)$ **b.** $\left(-\frac{9}{2}, -1\right]$ **c.** $\left[-\frac{9}{2}, -1\right)$ **d.** $\left(-\infty, -\frac{9}{2}\right] \cup (-1, \infty)$

Chapter 4.

67. *For the functions below and* $(f \circ g)(-2)$.

    a. 166 **b.** -128 **c.** -156 **d.** -7 **e.** 62 **f.** *none of these*

68. *Given that* $f(x) = 3x^2 - 2x + 5$ *and* $g(x) = 3x - 1$, *find* $g \circ f$

    a. $9x^2 - 6x + 14$ **b.** $9x^3 - 9x^2 + 17x - 5$ **c.** $3x^2 + x + 4$ **d.** $9x^2 + 6x - 16$
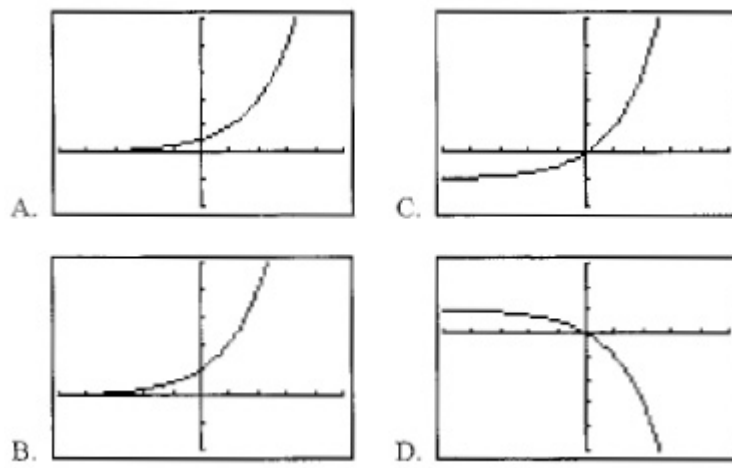
69. *Determine which of the following functions are one-to-one.*

A.   B.

C.   D.
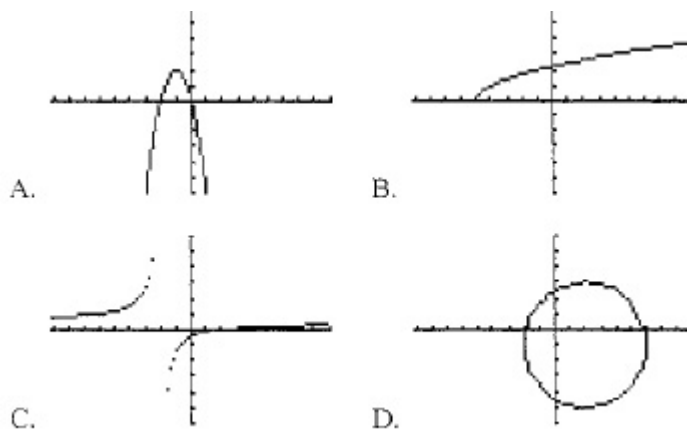
   a. *A only*

   b. *B and C*

   c. *D only*

   d. *all of the above*

   e. *none of the above*

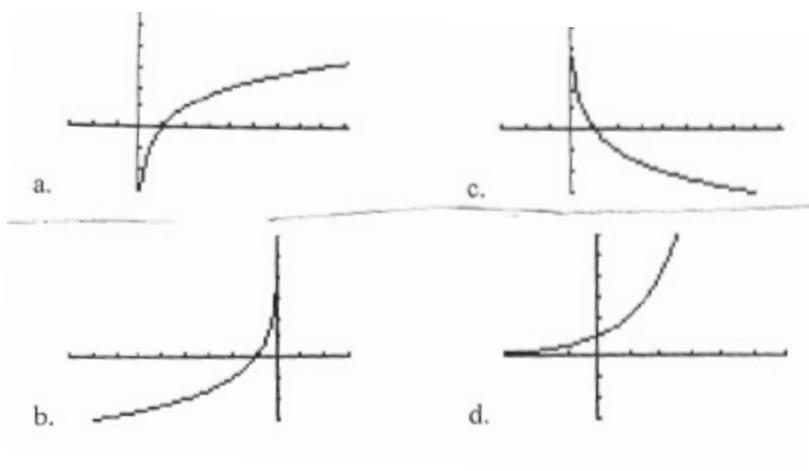**70.** *Find the inverse of* $f(x) = 2x + 3$

   a. $f^{-1}(x) = \frac{1}{2}(x + 3)$ **b.** $f^{-1}(x) = \frac{1}{2}(x - 3)$

   c. $f^{-1}(x) = \frac{2}{x-3}$ **d.** $f^{-1}(x) = \frac{2}{x+3}$

71. *Match the following functions with the correct graphs.*

A.

C.

B.

D.

a. $y = 2^x$ **b.** $y = 2^x - 1$ **c.** $y = 2^{(x-1)}$ **d.** $y = 1 - 2^x$

72. *Graph the following function* $y = \log_2 x$

a.

c.

b.

d.

73. *Convert the following to a logarithmic equation* $e^{-5} = 0.006738$

    a. $e = \log_{-5} 0.006738$ **b.** $\ln(0.006738) = -5$

    c. $0.006738 = \log_{-5} e$ **d.** $\ln(-5) = 0.006738$

74. *Convert the following to an exponential equation* $\log_{10}\left(\frac{1}{100}\right) = -2$

    a. $10^{100} = -2$ **b.** $10^{-2} = \frac{1}{100}$ **c.** $\left(\frac{1}{100}\right)^2 = 10$ **d.** $2^{10} = \frac{1}{100}$

75. *Use change of base to find the following:* $\log_5 \sqrt{7}$

    a. 1.6542 **b.** 0.6045 **c.** 0.4225   **d.** 0.9730

76. *Write* $\log_8 \frac{x^3\sqrt{x^2+4}}{(x+8)^8}$ *as a sum and difference of logarithms. Express all powers as factors.*

    a. $\log_8 x + \frac{1}{2}\log_8(x^2+4) - \log_8(x+8)$ **b.** $3\log_8 x + \frac{1}{2}\log_8(x^2+4) + 8\log_8(x+8)$

    c. $3\log_8 x + \frac{1}{2}\log_8(x^2+4) - 8\log_8(x+8)$ **d.** $3\log_8 x - \frac{1}{2}\log_8(x^2+4) - 8\log_8(x+8)$

77. *Find the value of* 3.56^{π}

    a. 54.0047 **b.** 540.0466 **c.** 5.4005   **d.** 53.8956

78. *Find the domain of this function:* $y = \log(x^2 - 16)$

    a. $(-16, 16)$ **b.** $(-\infty, -16) \cup (16, \infty)$ **c.** $(4, \infty)$

    d. $(-\infty, -4) \cup (4, \infty)$ **e.** $(-4, 4)$ **f.** *none of these*

79. *Find y such that:* $\log_2 \frac{1}{32} = y$

    a. $y = 5$ **b.** $y = -5$ **c.** *none of these*   **d.** $y = 0.09834$ **e.** $y = -4$

80. *Solve:* $3 \log_8 x = \log_8 216$

    a. $x = 36$ **b.** $x = 6$ **c.** $x = 2.44949$ **d.** $x = -6$ **e.** *none of these*

81. *Solve:* $\log_3(x + 5) - \log_3 x = 2$

    a. $x = 1$ **b.** $x = 5$ **c.** $x = \frac{8}{5}$ **d.** $x = \frac{5}{8}$

82. *Solve:* $\log_2(x + 3) = 2 - \log_2 x$

    a. $x = 1$ **b.** $x = -1$ **c.** $x = \{-4, 1\}$ **d.** $x = 3.2345$

83. *Solve this equation:* $75 = 300e^{-0.24t}$

    a. $t = 1732.87$ **b.** $t = 937.5$ **c.** $t = \ln(75) - \ln(300)$ **d.** $t = 5.78$

84. *Solve this equation:* $\log_4(x + 3) + \log_4(2 - x) = 1$

    a. $x = \{-1, 2\}$ **b.** $x = 2$ **c.** $x = 1$ **d.** $x = \{-2, 1\}$

85. *Solve this equation:* $6^{x-3} = 36^{4-3x}$

    a. $x = 2$ **b.** $x = \frac{11}{7}$ **c.** $x = 3.987$ **d.** $x = \frac{7}{4}$

86. *Solve this equation:* $3^{2x} + 3^x - 2 = 0$

    a. $x = 0$ **b.** $x = 1$ **c.** $x = \{-2, 1\}$ **d.** $x = \{2, -1\}$

87. *Solve this equation:* $5^x = 3^{2x-1}$

    a. $x = -1.8691$ **b.** $x = 1.8691$ **c.** $x = 2.3457$ **d.** $x = 1$

88. *You invest $25,000 in an account that is compounded continuously at 5.89% interest for 4 years. Find the value of your investment at the end of those 4 years.*

    a. $x = \$15,950.97$ **b.** $x = \$29,831.83$ **c.** $x = \$3,161.17$ **d.** $x = \$31,641.70$

89. *The population of a city doubled in 12 years. What was the exponential growth rate?*

    a. $x = 17.3\%$ **b.** $x = 8.3\%$ **c.** $x = 1.2\%$ **d.** $x = 5.8\%$

Chapter 5.

90. *Solve this system of two equations:*
$-2x + 5y = 3$
$3x - 7y = 4$

    a. $x = no\ solution$ **b.** $x = 41,\ y = 17$

    c. $x = 17,\ y = 41$ **d.** $x = 3,\ y = -5$

91. *Solve the following system:*
$2x - y + 3z = 11$
$x + 3y + z = 10$
$3x - 2y + 4z = 13$

    a. $x = (1, -2, 3)$ **b.** $x = (-1, 2, 5)$ **c.** $x = (-1, -2, 2)$ **d.** $(5, -1, 0)$

92. *Find the equilibrium point for the demand and supply functions $D(p) = 85 - 3p$ and $S(p) = 35 + 2p$.*

    a. $(\$5, 70)$ **b.** $(\$7, 49)$ **c.** $(\$10, 55)$ **d.** $(\$12, 59)$

93. *To the following matrix perform this row operation:*

$$R_2 = -2r_1 + r_2 \quad \begin{pmatrix} 1 & -3 & -3 & 2 \\ 2 & -9 & 2 & 6 \\ -3 & 1 & 3 & -6 \end{pmatrix}$$

a $\begin{pmatrix} 1 & -3 & -1 & 2 \\ 0 & -3 & 4 & 2 \\ -3 & 1 & 3 & -6 \end{pmatrix}$ **b** $\begin{pmatrix} 1 & -3 & -1 & 2 \\ 4 & 15 & 0 & 10 \\ -3 & 1 & 3 & -6 \end{pmatrix}$ **c** $\begin{pmatrix} 1 & -3 & -1 & 2 \\ -3 & 15 & -5 & -10 \\ -3 & 1 & 3 & -6 \end{pmatrix}$

94. *Let* $A = \begin{pmatrix} 1 & -2 & 0 \end{pmatrix}$ *and* $B = \begin{pmatrix} 3 & 0 & 1 \\ 2 & 4 & -1 \\ 0 & 2 & 1 \end{pmatrix}$. *Find AB.*
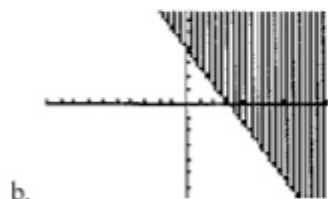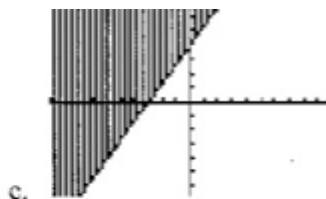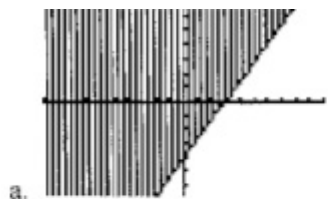
a. $\begin{pmatrix} -1 & -8 & 3 \end{pmatrix}$ **b.** $\begin{pmatrix} 3 & -6 & -4 \end{pmatrix}$ **c.** $\begin{pmatrix} 3 & 0 & 0 \\ 2 & -8 & 0 \\ 0 & -4 & 0 \end{pmatrix}$ **d.** $\begin{pmatrix} -1 \\ -8 \\ 3 \end{pmatrix}$

95. *Find the inverse of the following matrix* $A = \begin{pmatrix} 2 & 1 \\ 3 & 7 \end{pmatrix}$

a. $A^{-1} = \begin{pmatrix} 7 & -1 \\ -3 & 2 \end{pmatrix}$ **b.** $A^{-1} = \begin{pmatrix} \frac{7}{11} & -\frac{1}{11} \\ -\frac{3}{11} & \frac{2}{11} \end{pmatrix}$

c. $A^{-1} = \begin{pmatrix} -\frac{2}{11} & -\frac{1}{11} \\ -\frac{3}{11} & -\frac{7}{11} \end{pmatrix}$ **d.** $A^{-1} = \begin{pmatrix} \frac{2}{11} & \frac{1}{11} \\ \frac{3}{11} & \frac{7}{11} \end{pmatrix}$

96. *Which of the following represents the graph of* $4x - 3y \geq -12$

a.

c.

b.

d.
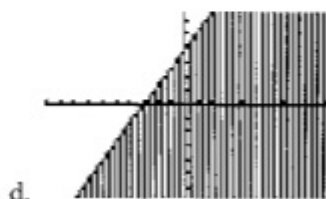
97. *When a single card is drawn from an ordinary 52-deck, find the probability of getting a Jack?* **a.** $\frac{1}{13}$ **b.** $\frac{1}{4}$ **c.** $\frac{1}{26}$ **d.** $\frac{1}{52}$