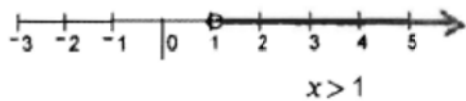


**Math 0702 Review Problems - Final Exam
Answers**

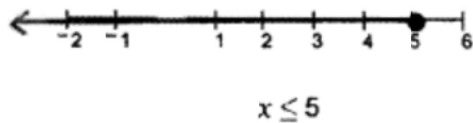
1. 81
2. -81
3. -8
4. -4
5. The root does not exist as a real number.
6. 12

7.
 - a. $x = -3$
 - b. $y = 210$
 - c. Identity; $\mathbf{S} = \{\text{All real numbers}\}$
 - d. $y = \frac{1}{3}$
 - e. Contradiction; No solution
 - f. Contradiction; No solution
 - g. $x = 2$
 - h. $x = \frac{1}{3}$

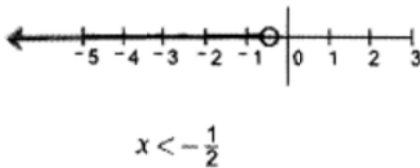
8. a. $\mathbf{S} = (1, \infty)$



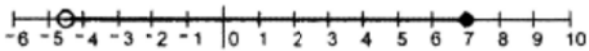
- b. $\mathbf{S} = (-\infty, 5]$



- c. $\mathbf{S} = (-\infty, -\frac{1}{2})$



- d. $\mathbf{S} = (-\frac{9}{2}, 7]$



- e. $\frac{96 + 90 + 87 + 95 + T}{5} \geq 90; T \geq 82$

- f. $37B + 160 \leq 900; B \leq 20$ boxes

9.
 - a. $\mathbf{S} = (\frac{7}{8}, \frac{27}{20}]$
 - b. $\mathbf{S} = \emptyset$
 - c. $\mathbf{S} = (\frac{11}{3}, \infty)$
 - d. $\mathbf{S} = (-\infty, \infty)$
 - e. $\mathbf{S} = (5, \infty)$

10.
 - a. $x_1 = -11, x_2 = 27$
 - b. $x_1 = 9, x_2 = 19$
 - c. No solution
 - d. $x = \frac{1}{3}$
 - e. $x_1 = 3, x_2 = 7$
 - f. $x_1 = \frac{12}{7}, x_2 = 84$

11.
 - a. $\mathbf{S} = (-1, 5)$
 - b. $\mathbf{S} = (-\infty, -9] \cup [11, \infty)$
 - c. $\mathbf{S} = \{-\frac{2}{5}\}$
 - d. $\mathbf{S} = (-\infty, -\frac{2}{3}) \cup (2, \infty)$
 - e. $\mathbf{S} = (-\infty, \infty)$
 - f. $\mathbf{S} = (-1, \frac{7}{3})$

12.
 - a. $\mathbf{D} = \{0, 1, 2\}, \mathbf{R} = \{-2, 1, 2, 3\}$
Not a function
 - b. $\mathbf{D} = \{-4, -2, 0, 2\}, \mathbf{R} = \{0, 1, 2, 3\}$
Function
 - c. $\mathbf{D} = \{-1, 4, 5, 7\}, \mathbf{R} = \{2, 3\}$
Function
 - d. $\mathbf{D} = \{\text{Input elements}\},$
 $\mathbf{R} = \{\text{Output elements}\}$
Function
 - e. $\mathbf{D} = (-\infty, \infty), \mathbf{R} = [-3, \infty)$
Function
 - f. $\mathbf{D} = (-\infty, \infty), \mathbf{R} = \{2\}$
Function
 - g. $\mathbf{D} = [1, \infty), \mathbf{R} = (-\infty, \infty)$
Not a function

13. Linear functions are b and d; others are not.

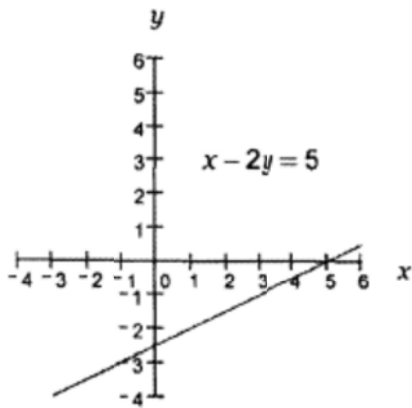
14.
 - a. Yes
 - b. Yes

15.
 - a. $f(-3) = -18$
 - b. $g(3) = 78$
 - c. $h(-2) = 5$
 - d. $R(-12) = -\frac{3}{5}$

16.
 - a. $(-2, 7)$
 - b. $g(1) = -2$
 - c. $x = 0$
 - d. $x = -2, 2$

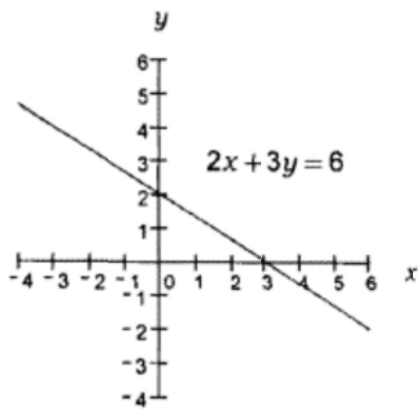
17. a. x -intercept = 5

y -intercept = $-\frac{5}{2}$



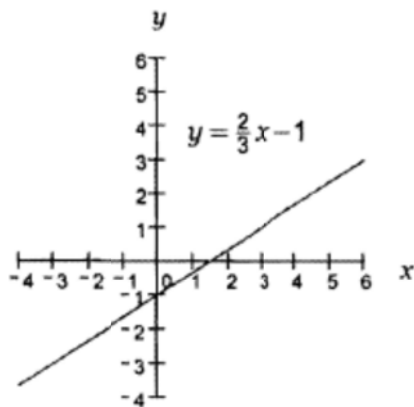
b. x -intercept = 3

y -intercept = 2



c. x -intercept = $\frac{3}{2}$

y -intercept = -1

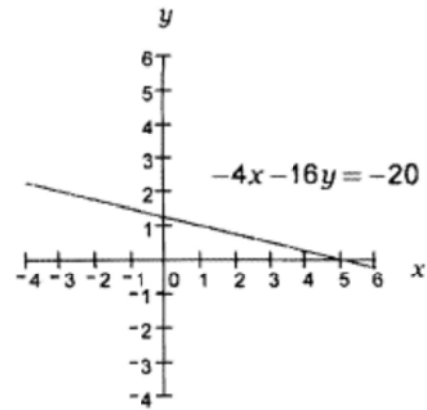


18. a. $m = \frac{3}{5}$, $b = -2$

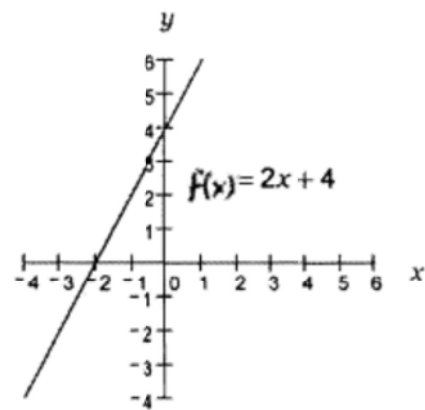
b. $m = \frac{4}{3}$, $b = -\frac{7}{3}$

c. $m = 0$, $b = -5$

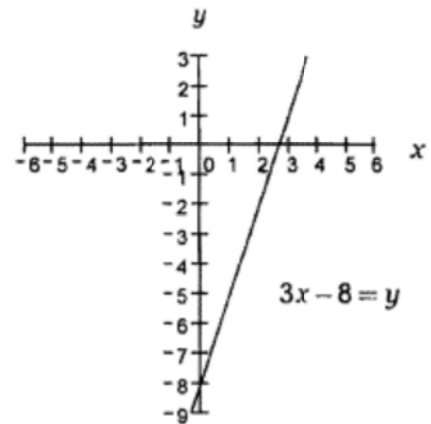
19. a.



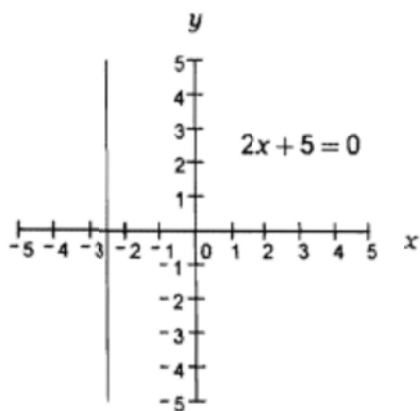
b.



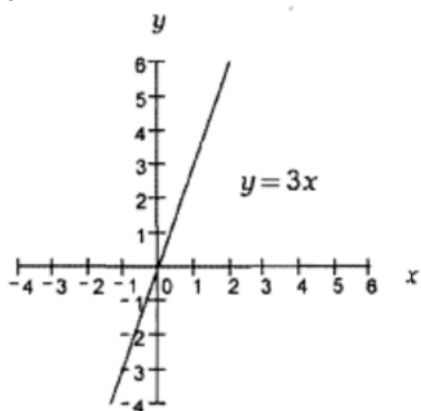
c.



19. d.



e.



20. a. $m = -7$
 b. $m = 0$
 c. slope = $\frac{1}{8}$
 d. $y = \frac{2}{3}x - 2$

21. a. $y = \frac{1}{4}x - 3$
 b. $3x + 7y = 35$
 c. $f(x) = -\frac{1}{5}x - \frac{28}{5}$
 d. $3x - y = 7$

22. a. perpendicular
 b. neither parallel nor perpendicular

23. $x - 2y = -10$

24. $\frac{1}{9}$

25. $\frac{8}{27}$

26. $\frac{1}{x^7}$

27. x^9

28. p^9

29. x^5

30. $20x^8$

31. $-24x^8y^5$

32. $10x^2y^7$

33. $\frac{x^8}{16y^{12}}$

34. $2^{15}a^5$

35. $\frac{x^{15}}{y^{15}z^{24}}$

36. $\frac{1}{8y^5}$

37. $\frac{b^6}{27a^{13}}$

38. $7x^2 - 10x - 7$

39. $-3x^2 + 15x - 15$

40. $-2x^7 + 3x^6 + 3x^5 + 11$

41. $-6a^7 - 15a^4 + 21a^3$

42. $-\frac{1}{28}x^{10}$

43. $12x^2 + x - 35$

44. $49x^2 - 42x + 9$

45. $x^2 - \frac{1}{36}$

46. $2x^3 - 11x^2 - 25x + 28$

47. a. $36 - 4a^2 + 4ab - b^2$
 or
 $= -4a^2 + 4ab - b^2 + 36$

b. $x^4 - 2401$

48. a. $2n^2 - 9n + 10$

b. $4ah + 2h^2 - h$

49. $A = 2x^2 + x - 3$

50. $6(y - 3)$

51. $4x^2y^2(y - 3x)$

52. $(x - 7)(x - 5)$

53. $(x + 4)(x - 9)$

54. $2p^2(p + 3)(p^2 - 3p + 9)$

55. $(5a - 2)(2a - 3)$

56. $(2x - 7)^2$

57. $(x + 5)(x - 5)$

58. $(2x + 5)(4x - 3)$

59. $(x^2 + 9)(x + 3)(x - 3)$

60. $= 64 - 4x^2 = (8 + 2x)(8 - 2x)$

61. $2(1 + 3a)(1 - 3a)$

62. $(n + p)(m - 7)$

63. $5x(x + 5)(x - 3)$

64. $\left(y + \frac{1}{12}\right)\left(y - \frac{1}{12}\right)$

65. prime

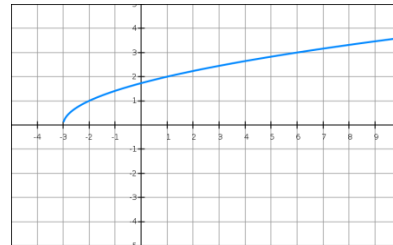
66. $(x - y)(x^2 + xy + y^2)$

67. $(r^2 + t^3)(r^4 - r^2t^3 + t^6)$

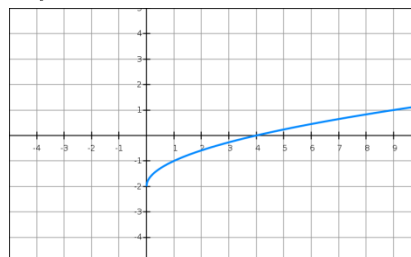
68. $x_1 = 0, x_2 = 4$
69. $z_1 = 0, z_2 = \frac{1}{3}$
70. $y_1 = -2, y_2 = 6$
71. $x_1 = -\frac{1}{2}, x_2 = \frac{5}{3}$
72. $b_1 = -3, b_2 = 0, b_3 = 6$
73. $a_1 = -4, a_2 = -\frac{4}{3}$
74. $x_1 = -4, x_2 = -1, x_3 = 1$
75. $n(n+6) = 72 \leftrightarrow n = -12, 6$
 Numbers are -12 and -6 or
 Numbers are 6 and 12
76. a. $h(2) = 1024$ feet
 b. $h(t) = 0$ when $t = 10$ sec.
77. **A** $h(x) = x(x+2)(x-2)$
B $g(x) = (2x-1)(x+2)$
C $f(x) = (x-2)(x+3)$
78. a. $f(3) = \frac{4}{5}$
 b. $f(0) = \frac{5}{4}$
 c. $f(-2)$ is undefined
79. a. $D_R = (-\infty, -3) \cup (-3, \infty)$
 b. $D_Q = (-\infty, -3) \cup (-3, 8) \cup (8, \infty)$
80. a. $-\frac{2st^4}{3r^5}$
 b. $-\frac{x}{x-3} = \frac{x}{3-x}$ (either one)
 c. $\frac{a^2 - ab + b^2}{a-b}$
 d. $\frac{y-7}{y+9}$
81. $\frac{3mx^2y^2}{2} = \frac{3}{2}mx^2y^2$ (either one)
82. $\frac{9x^3y^3}{ab}$
83. $-3a$
84. $2(x-3)$
85. $\frac{r}{r-6}$
86. $\frac{1}{a+5}$
87. $\frac{8-2k}{k(k+2)}$
88. $\frac{x-2}{x(x-4)}$
89. $-\frac{3}{x-9} = \frac{3}{9-x}$ (either one)

90. $\frac{b-4}{4b}$
91. $\frac{9y+17}{(y-7)(y+3)^2}$
92. a. No
 b. $x^2 + 6$
 c. $6x^3 + 9x^2 + 6x - 6$
 d. No
93. The root does not exist as a real number.
94. 4
95. $2\sqrt{33}$
96. $6y$ if we assume values of y are nonnegative
 $6|y|$ if y represents any real number
97. $2\sqrt[3]{3}$
98. $9m^{11}$, values of m are nonnegative
99. $2x$
100. $4xy^3\sqrt{2}$, values of x and y are nonnegative
101. $2x^2y^4\sqrt[3]{9}$, values of x and y are nonnegative
102. $x+3$ if we assume values of x are nonnegative
 $|x+3|$ if x represents any real number
103. $3a^4\sqrt{2a}$, values of a are nonnegative
104. $4p^2q^3\sqrt[3]{pq}$, values of p and q are nonnegative
105. $-\frac{x^{13}}{y^7}\sqrt{\frac{15x}{y}}$, values of x and y are nonnegative
106. $x^2y^2z^3\sqrt[4]{x^3yz}$, values of variables are nonnegative
107. $2a^2b^5\sqrt[3]{b^3}$, values of a and b are nonnegative
108. a. $f(2) = 1$
 b. $f(3) = 2$
 c. The root does not exist as a real number.
 d. $f(11) = 2\sqrt{7}$

109. $D_f = [-3, \infty)$



110. $D_f = [0, \infty)$



$$111. -\sqrt{81} = -9$$

$$112. \left(\sqrt{\frac{25}{36}}\right)^3 = \frac{125}{216}$$

$$113. \sqrt{9x^{10}} = 3x^5, \text{ values of } x \text{ are nonnegative}$$

$$114. \sqrt[5]{3m}$$

$$115. \sqrt{3x^4} = x^2\sqrt{3}, \text{ values of } x \text{ are nonnegative}$$

$$116. \sqrt[3]{(6x-1)^2}$$

$$117. \frac{1}{27}$$

$$118. \frac{1}{25^{5/4}}$$

$$119. x^{1/3}$$

$$120. \frac{4y^{2/3}}{7}$$

$$121. 10^{7/6}$$

$$122. 9x^{3/2}$$

$$123. x^{-1/3} = \frac{1}{x^{1/3}}$$

$$124. \frac{x^2}{y^{1/6}}$$

$$125. y + 9y^{1/2} + 20$$

$$126. y\sqrt{5} + 5\sqrt{y}$$

$$127. 108 + 28\sqrt[3]{21}$$

$$128. -2\sqrt{6} + 4\sqrt{10}$$

$$129. 2x + 20\sqrt{x} + 50$$

$$130. -16 + 3\sqrt[3]{2} - 6\sqrt[3]{4}$$

$$131. 2x - 52$$