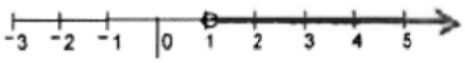
Math 0702 Review Problems - Final Exam
Answers

1. 81
2. -81
3. $-\frac{1}{81}$
4. $\frac{1}{81}$
5. -81
6. 81

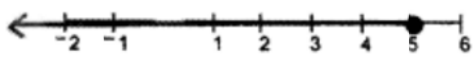
7. a. $x=-3$
   b. $y=210$
   c. Identity; $\mathbf{S}=\{\text{All real numbers}\}$
   d. $y=\frac{1}{3}$
   e. Contradiction; No solution
   f. Contradiction; No solution
   g. $x=2$
   h. $x=\frac{1}{3}$

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



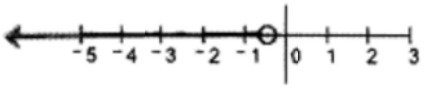
$x>1$

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



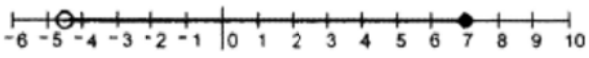
$x\le 5$

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



$x<-\frac{1}{2}$

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



9. a. $\mathbf{S}=\left(\frac{7}{8},\frac{27}{20}\right]$
   b. $\mathbf{S}=\varnothing$
   c. $\mathbf{S}=\left(\frac{11}{3},\infty\right)$
   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. $\mathbf{S}=\left\{-\frac{2}{5}\right\}$
    d. $\mathbf{S}=\left(-\infty,-\frac{2}{3}\right)\cup(2,\infty)$
    e. $\mathbf{S}=(-\infty,\infty)$
    f. $\mathbf{S}=\left(-1,\frac{7}{3}\right)$

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

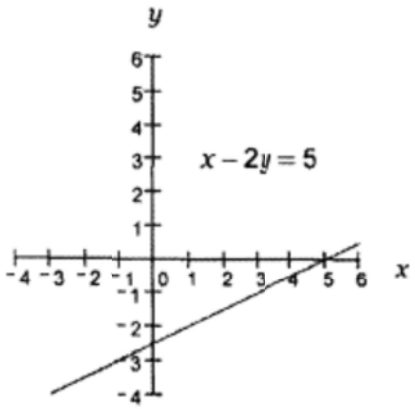
13. a. $\mathbf{D}_f=(-\infty,\infty)$
    b. $\mathbf{D}_g=(-\infty,-4)\cup(-4,\infty)$
    c. $\mathbf{D}_g=(-\infty,3)\cup(3,\infty)$
    d. $\mathbf{D}_f=(-\infty,\infty)$

14. a. Yes
    b. Yes

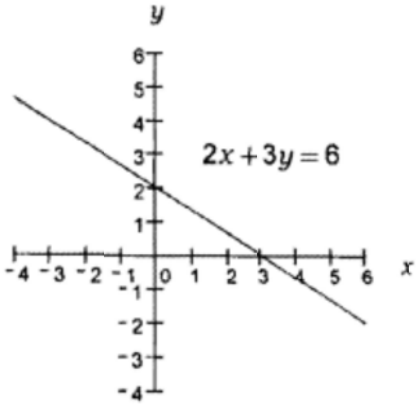
15. a. $f(-3)=-18$
    b. $g(3)=78$
    c. $h(-2)=5$
    d. $R(-12)=-\frac{3}{5}$

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

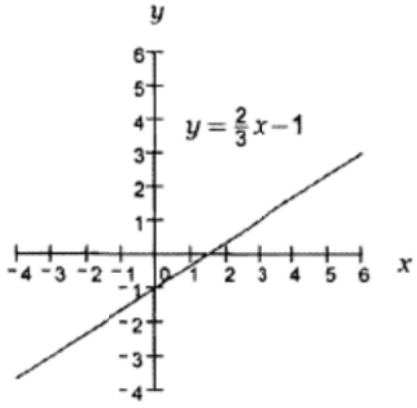
17. a. x-intercept $= 5$
    y-intercept $= -\frac{5}{2}$



    b. x-intercept $= 3$
    y-intercept $= 2$

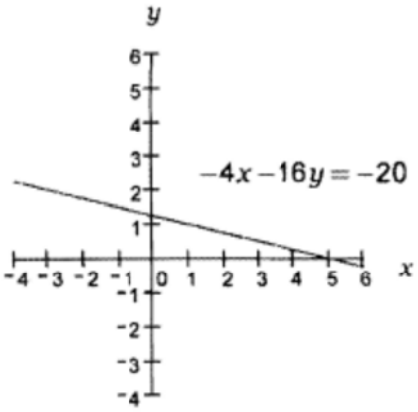


    c. x-intercept $= \frac{3}{2}$
    y-intercept $= -1$

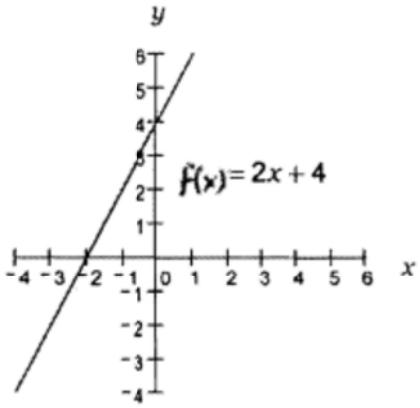


18. a. $m = \frac{3}{5},\ b = -2$
    b. $m = \frac{4}{3},\ b = -\frac{7}{3}$
    c. $m = 0,\ b = -5$

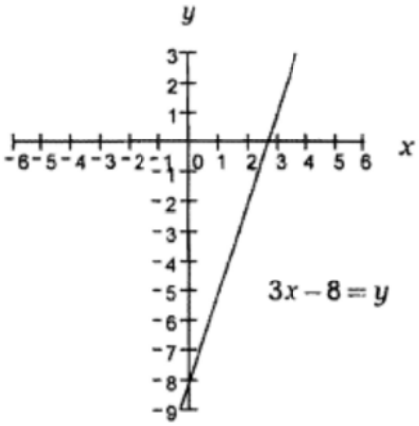
19. a.



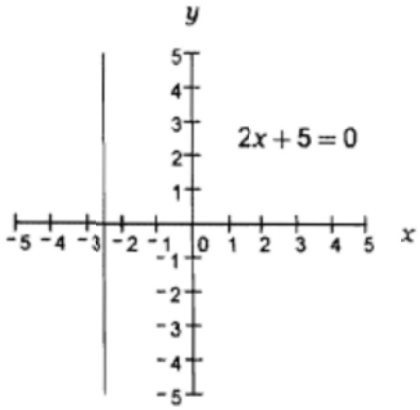
    b.



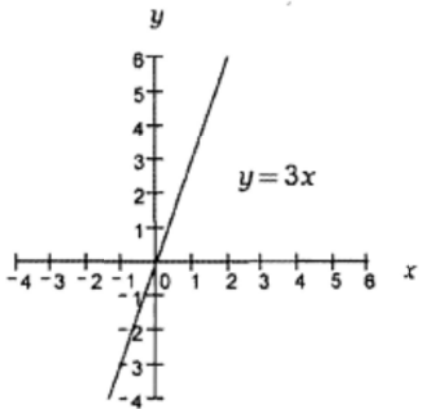
    c.



19. d.



e.



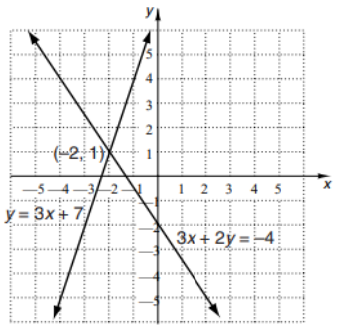
20. a. $m = -7$
    b. $m = 0$
    c. slope $= \frac{1}{8}$
    d. $y = \frac{2}{3}x - 2$

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

22. a. perpendicular
    b. neither parallel nor perpendicular

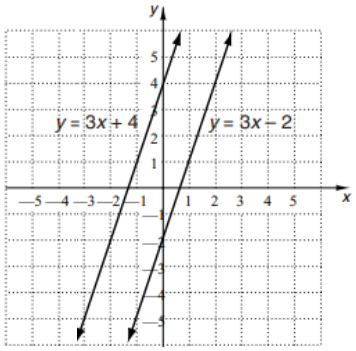
23. $y = \frac{1}{2}x + 5$

24. a.



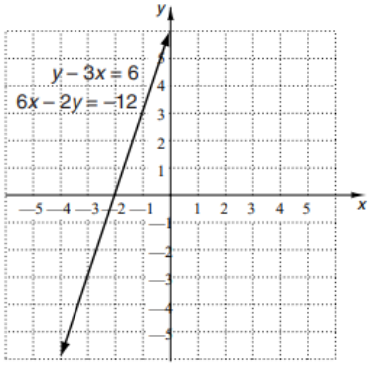
24. a. System is *consistent*.
    Equations are *independent*.

    b.



    No solution.
    System is *inconsistent*.
    Equations are *independent*.

    c.



    Infinitely many solutions.
    System is *consistent*.
    Equations are *dependent*.

25. a. $L_1 \cap L_2 = \{(2, -3)\}$
    b. $L_1 = L_2$: There are infinitely many solutions.
    c. $L_1 \cap L_2 = \{(3, \frac{8}{3})\}$
    d. $L_1 \cap L_2 = \varnothing$: There is no solution ($L_1 \parallel L_2$).

26. a. **28 *l*** of 80% alcohol solution
    42 *l* of 30% alcohol solution
    b. Trains meet **945 miles** from the station
    c. Speed of plane in still air was **120 km/hr**.

27. $\frac{1}{9}$
28. $\frac{8}{27}$
29. $\frac{1}{x^7}$
30. x^9
31. p^9
32. x^5
33. $20x^8$
34. $-24x^8y^5$
35. $10x^2y^7$

36. $\dfrac{x^8}{16y^{12}}$

37. $2^{15}a^5$

38. $\dfrac{x^{15}}{y^{15}z^{24}}$

39. $\dfrac{1}{8y^5}$

40. $\dfrac{b^6}{27a^{13}}$

41. $7x^2-10x-7$

42. $-3x^2+15x-15$

43. $-2x^7+3x^6+3x^5+11$

44. $-6a^7-15a^4+21a^3$

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

46. $12x^2+x-35$

47. $49x^2-42x+9$

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

49. $2x^3-11x^2-25x+28$

50. x^4-2401

51. a. $2n^2-9n+10$
    b. $4ah+2h^2-h$

52. $6(y-3)$

53. $4x^2y^2(y-3x)$

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

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

56. $2p^2(p+3)\left(p^2-3p+9\right)$

57. $(5a-2)(2a-3)$

58. $(2x-7)^2$

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

60. $(2x+5)(4x-3)$

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

62. $-4(x+4)(x-4)$

63. $-2(3a+1)(3a-1)$

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

65. $5x(x+5)(x-3)$

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

67. prime

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

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

70. $x_1=0,\ x_2=4$

71. $z_1=0,\ z_2=\frac{1}{3}$

72. $y_1=-2,\ y_2=6$

73. $x_1=-\frac{1}{2},\ x_2=\frac{5}{3}$

74. $b_1=-3,\ b_2=0,\ b_3=6$

75. $a_1=-4,\ a_2=-\frac{4}{3}$

76. $x_1=-4,\ x_2=-1,\ x_3=1$

77. a. $h(2)=1024$ feet
    b. $h(t)=0$ when $t=10$ sec.

78. a. $f(3)=\frac{4}{5}$
    b. $f(0)=\frac{5}{4}$
    c. $f(-2)$ is undefined

79. a. $\mathrm{D}_R=(-\infty,-3)\cup(-3,\infty)$
    b. $\mathrm{D}_Q=(-\infty,-3)\cup(-3,8)\cup(8,\infty)$

80. a. $-\dfrac{2st^4}{3r^5}$
    b. $-\dfrac{x}{x-3}=\dfrac{x}{3-x}$ (either one)
    c. $\dfrac{a^2-ab+b^2}{a-b}$
    d. $\dfrac{y-7}{y+9}$

81. $\dfrac{3mx^2y^2}{2}=\frac{3}{2}mx^2y^2$ (either one)

82. $\dfrac{9x^3y^3}{ab}$

83. $-3a$

84. $2(x-3)$

85. $\dfrac{r}{r-6}$

86. $\dfrac{(a+6)(a+3)}{3(a-4)}$

87. $\dfrac{(4y^2-6y+9)}{(4y-1)(2y-3)}$

88. $3x^2$