Papillion La-Vista South High School
Practice Set of Required Math Skills for
Honors Precalculus

Solutions

1.1 Rectangular Coordinates

Pythagorean Theorem: $a^2 + b^2 = c^2$
Distance Formula: $d = \sqrt{(x_2 - x_1) + (y_2 - y_1)}$
Midpoint Formula: $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

1. $\left(\frac{3}{2}, -\frac{3}{2} \right)$
2. $\sqrt{202}$
3. $11^2 + 9^2 = c^2 \quad c = \sqrt{202}$
4. $\overline{AB} = \sqrt{5}$, $\overline{BC} = \sqrt{45}$, $\overline{AC} = \sqrt{50}$

   $\sqrt{5}^2 + \sqrt{45}^2 = \sqrt{50}^2$ ✓ *Yes*
5. Midpoint of (b, c) and $(a, 0)$: $\left(\frac{a+b}{2}, \frac{c}{2} \right)$

   Midpoint of $(0, 0)$ and $(a + b, c)$: $\left(\frac{a+b}{2}, \frac{c}{2} \right)$

   ✓ Midpoints are the same.
6. c
7. a
8. b
9. d

1.2 Graphs of Equations

How to find *x*-intercepts: Substitute $y = 0$
How to find *y*-intercepts: Substitute $x = 0$
Standard form of circle: $(x - h)^2 + (y - k)^2 = r^2$

10. a) yes b) yes
11. a) yes b) no
12. a) no b) yes
13. a) yes b) no
14. *x*-int: $\left(\frac{6}{5}, 0 \right)$ *y*-int: $(0, -6)$
15. *x*-int: $(4, 0)$ *y*-int: $(0, 2)$
16. *x*-int: $(0, 0)$ and $(2,0)$ *y*-int: $(0, 0)$
17. *x*-int: $(4, 0)$ and $(-4,0)$ *y*-int: $(0, -16)$
18. $(x - 2)^2 + (y + 1)^2 = 16$
19. $x^2 + y^2 = 17$

1.3 Linear Equations in Two Variables

Slope-Intercept Form: $y = mx + b$
Point-Slope Form: $y - y_1 = m(x - x_1)$
Equation of vertical line: $x = a$
Equation of horizontal line: $y = a$
Define slope: rise over run
Equation for slope through 2 points: $m = \frac{y_2 - y_1}{x_2 - x_1}$
Parallel lines: same slope
Perpendicular lines: opposite reciprocal slopes

20. $m = -\frac{7}{6}$ y-int : $(0, 5)$
21. $m =$ undefined y-int : none
22. $m = 0$ y-int : $(0, -4)$
23. $m = \frac{2}{3}$ y-int : $(0, -3)$
24. $y = -\frac{3}{5}x + 2$
25. $x = -8$
26. $y = -\frac{3}{25}x + \frac{159}{100}$
27. $y = 0.6$
28. a) $y = 2x - 3$ b) $y = -\frac{1}{2}x + 2$
29. a) $y = -\frac{3}{4}x + \frac{3}{8}$ b) $y = \frac{4}{3}x + \frac{127}{72}$
30. a) $x = 2$ b) $y = 5$
31. B
32. C
33. A
34. D
35. $W = 0.75x + 11.50$

1.4 Functions

Domain represents: all possible *x*-values
Domain represents: all possible *y*-values
Function: Each input has one output

36. yes
37. no
38. no
39. yes
40. a) -1 b) -9 c) $2x-5$
41. a) 2 b) 5 c) $\sqrt{x}+2$
42. a) $-\frac{1}{9}$ b) *undefined* c) $\frac{1}{y^2+6y}$
43. a) 0 b) -0.75 c) x^2+2x
44. a) 6 b) 6 c) $\left|x^2\right|+4$
45. $x=6$
46. $x=\frac{-3\pm\sqrt{73}}{4}$
47. $x \le -\frac{23}{4}$
48. $x > -2$ or $x \le -13$
49. $x=\frac{5}{2}$
50. no solution
51. $x=-1$
52. $t=\frac{15}{8}$
53. $x=-\frac{1}{5}$
54. $x=0,\ \pm 1$
55. $x=5\pm 2\sqrt{2}$
56. $x=-\frac{1}{3},-1$
57. $x=3\pm\sqrt{5}$
58. $x=3,-1$
59. $x=-\frac{11}{3}$
60. $x=11$
61. $x=2$
62. $x=4$
63. $2\sqrt{2}\,x$
64. $|x|\sqrt[4]{x}$
65. $\frac{10\sqrt{7x}}{x}$
66. $10\sqrt{5}+15$
67. $y^{1/6}$ or $\sqrt[6]{y}$
68. $\frac{-20}{(x+5)(x-5)}$
69. $\frac{3x-2}{x(x-1)}$
70. $\frac{3x-5}{2(x-5)}$
71. $\frac{(x-4)\sqrt{x^2-4}}{(x+2)(x-2)}$
72. $\frac{x+1}{x(x+2)}$
73. $\frac{x+1}{(x-7)(x+3)}$
74. $(x-5-y)(x-5+y)$
75. $(x-4)(x^2+4x+16)$
76. $3x(x-5)(x+3)$