

Answers to Practice Problems in Algebra, Trigonometry, and Analytic Geometry

1. 13
2. $x + 2x^{\frac{1}{2}}y^{\frac{1}{2}} + y$
3. $\frac{6}{(x+1)(x-1)}$
4. $\frac{2x^2+8x+1}{x(x+3)^2}$
5. $x = 9, x = -3, x = 0$
6. $\frac{x^3}{81y^3}$
7. $\frac{x}{3(x+2)}$
8. $-2 \pm \frac{3\sqrt{2}}{2}$
9. The solution is that the equation has no solution
10. $x = 4$
11. $x = -8, x = 2$
12. $y = \frac{5x}{10-3x}$
13. $\frac{3bc+3ac-6ab}{abc}$
14. $x = 100$
15. $x = \frac{1}{100}, x = \frac{1}{10}$
16. 1
17. $x = \text{Log}(3), x = \text{Log}(2)$
- 18a) x^6
- 18b) $x^{\frac{5}{2}}$
19. $(x-2)^2 + 1$
20. $3(x + \frac{5}{6})^2 - \frac{49}{12}$
21. $-(x-2)^2 + 9$
22. $-4 < x < -1$
23. $x < \frac{-4}{3}$ or $2 < x$
24. $2\text{Log}x - \frac{1}{2}\text{Log}(x-1)$
25. $x = 6$
26. $x = \pm \sqrt{2}$
27. $x = 6, x = 2$
28. $x = 12$
29. $x = \frac{5}{7}$
30. $(x-2)^{\frac{3}{2}}(x+5)^{\frac{3}{2}}$
31. -24
32. $\frac{1}{x^{\frac{8}{15}}}$
33. $x^{\frac{31}{48}}$
34. The graph is a parabola with axis of symmetry $x = -2$, Vertex $(-2,1)$, y-intercept $(0,5)$, there are no x-intercepts,. the parabola opens upwards.
35. The graph is a parabola with axis of symmetry $x = 2$, Vertex $(2, -4)$, y-intercept $(0,0)$, x-intercepts are $(0,0)$ and $(4,0)$. the parabola opens upwards
36. The graph is a parabola with axis of symmetry $y = \frac{3}{8}$, Vertex $(-\frac{9}{16}, \frac{3}{8})$, y-intercept $(0,0)$, and $(0, \frac{3}{4})$, x-intercept $(0,0)$, the parabola opens to the right

37. The graph is a circle of radius 3, with center at the origin and intercepts, $(0,3)$, $(0, -3)$, $(3,0)$ and $(-3,0)$
38. $\frac{7}{25}$
39. The roots are $x = 2$, $x = \frac{3}{5}$, a factorization is $(x - 2)(5x - 3)$
40. $(x - 2)(2x + 1)(x - \frac{1}{3})$
41. $x = \frac{1}{3}$, $x = -\frac{1}{2}$
42. $2x^2 + \frac{1}{3}x - \frac{1}{3}$
43. $y = -\frac{x}{5} + \frac{1}{5}$
44. $y = -\frac{5}{3}x + 5$
45. $(1, 0)$, $(-4, 1)$
46. $y = x + 7$
47. $y = -\sqrt{3}x - \sqrt{3} + 3$
48. $y = -x - \frac{5}{3}$
49. $\frac{x}{3} - \frac{4}{3}$
50. $5x^2 - 2y^2$
51. $2x^2 - 10\sqrt{2}x + 25$
52. $\frac{-9}{4}$
53. $(0, 0)$, $(4, 0)$, $(-4, 0)$
54. $(0, 0)$, $(1, 0)$
55. $(-\frac{1}{4}, \frac{3}{16})$, $(2, -\frac{3}{2})$, $(0, \frac{1}{2})$
56. $(a,b,c) = (\frac{1}{2}, -3, \frac{13}{2})$
57. $(\frac{6}{5}, \frac{7}{5})$
58. $y = -\frac{1}{3}x + \frac{1}{3}$
59. $x = \pm 2$. $x = \pm\sqrt{2}$
60. $(1, -2)$, $(-1, 2)$, $(2\sqrt{3}, -\frac{\sqrt{3}}{3})$, $(-2\sqrt{3}, \frac{\sqrt{3}}{3})$
61. $x = -3$, $x = 1$
62. $x = 5$, $x = -3$, $x = 1$
63. $2\sqrt{3} - 4$
64. quotient = $\frac{2x}{3} + \frac{13}{9}$, remainder = $\frac{8}{9}$
65. $A = 7$, $B = -5$
66. $A = -\frac{1}{4}$, $B = \frac{1}{4}$, $C = \frac{3}{2}$
67. $A = -1$, $B = 1$, $c = 11$
68. $\frac{4x^2 - 29x + 43}{(x-1)(x-4)^2}$
69. $\frac{-5x+2}{x((x+2)(x-2)^2)}$
70. $\frac{3\pi}{4}$ radians
71. $\frac{900}{\pi}$ degrees
- 72.. $\frac{\pi}{2}$ inches
73. $\frac{-\sqrt{3}}{2}$
74. $\frac{-\sqrt{3}}{2}$
75. $40\sqrt{3}$
76. $x = \frac{3\pi}{4}$

77. $-\frac{1}{2}\sqrt{2+\sqrt{3}}$ or equivalently $-\left(\frac{\sqrt{6}+\sqrt{2}}{4}\right)$
78. $(x^2 + y^2)^{\frac{3}{2}} = x^2 - y^2$
79. $r = 3\sec\theta$
80. The period is $\frac{1}{2}\pi$, the function has vertical asymptotes at $x = -\frac{\pi}{4}$ and $x = \frac{\pi}{4}$
81. $x^2 - 3 + 2\sqrt{2}$
82. $b = \frac{10}{3}$
83. $x = 3$
84. 0
85. for $x \neq 1, x \neq 0, x \neq -1, \frac{1+\frac{1}{x}}{\frac{1}{x}-x} = \frac{1}{1-x}$
86. $x = (42 + k360)^\circ, x = (138 + k360)^\circ$ for $k =$ any positive or negative integer
87. $\frac{3}{5}$
88. $\frac{1}{\sin x}$ or $\csc x$
89. 2
90. $-\sin x$
91. $\frac{24}{25}$ if x is a first quadrant angle, $-\frac{24}{25}$ if x is a second quadrant angle
92. $(0, -1), (3, 2)$
93. $\frac{\pi}{2}$
94. $\frac{2}{5}$
95. 15
96.
$$\begin{aligned} \frac{2\sin^2 x}{\sin 2x} + \frac{1}{\tan x} &= \frac{2\sin^2 x}{2\sin x \cos x} + \frac{\cos x}{\sin x} \\ &= \frac{\sin x}{\cos x} + \frac{\cos x}{\sin x} \\ &= \frac{\sin^2 x + \cos^2 x}{\cos x \sin x} \\ &= \frac{1}{\cos x \sin x} \\ &= (\sec x)(\csc x) \end{aligned}$$
97. $(\frac{1}{2}, -1, 2)$
98. $-\frac{36}{85}$
99. $x = \frac{\pi}{3}$ radians or equivalently 60 degrees.
100. 2
101. $\frac{1}{2}$
102. $(\cos x + 1)(3\cos x - 2)$
103. $\frac{5}{12}$
104. $\frac{5}{6}$
105. $8''$
106. $-\frac{1}{4}$
107. 35
108. 3
109. $\frac{5\sqrt{7+15}}{2}$
110. 1
111. $\frac{\sqrt{3}}{2}$
- 112a) $-\frac{1}{3}$

- 112b) $+\frac{1}{3}$
 113. $\sin x$
 114. 144π
 115. length = 8", width = 2"
 116. $\frac{\pi}{3}, \pi, \frac{5\pi}{3}$
 117. $\frac{3}{2}$
 118. 13
 119. $\frac{7\pi}{6}, \frac{\pi}{2}, \frac{11\pi}{6}$
 120. 4π
 121. -2
 122. $\frac{\sqrt{2}}{2}$
 123. $x^2 + y^2 = 25$
 124. 13
 125. $(\frac{7}{2}, 4)$
 126. center (1, -2), vertices (3, -2), (-1, -2), (1, 1), (1, -5)
 127. $y = \frac{1}{2}x, y = -\frac{1}{2}x$
 128. $y = -\frac{5}{12}x + \frac{131}{24}$
 129. $(x - 3)^2 + (y + 1)^2 = 9$
 130. $(\sqrt{\frac{\sqrt{5}-1}{2}}, \frac{\sqrt{5}-1}{2}), -\sqrt{\frac{\sqrt{5}-1}{2}}, \frac{\sqrt{5}-1}{2}$
 131. $\frac{x^2}{16} + \frac{y^2}{4} = 1$
 132. $\frac{-x^2}{1} + \frac{y^2}{4} = 1$
 133. 7
 134. 24
 135. 7
 136. $10\sqrt{3}$
 137. 16
 138. center (3, -1), radius = 3
 139. $x = y^2 - 4y$
 140. $(2\sqrt{3}, \frac{\pi}{3} + k2\pi), (-2\sqrt{3}, \frac{4\pi}{3} + k2\pi)$ where k is any positive or negative integer.
 141. 14
 142. $\frac{7}{11}$
 143. 4
 144. $(x - 2)^2 + (y - 3)^2 = 8$
 145. $x = 2$, Vertex (2, -7)
 146. $40^\circ, 90^\circ, 50^\circ$
 147. $\sqrt{3}$
 148. $4\sqrt{3}$
 149. $y = \frac{-4}{3}x - \frac{5}{3}$
 150. $\frac{\pi}{2}$