

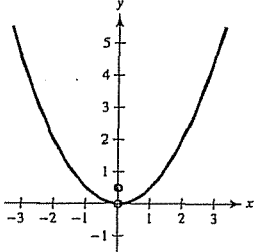
Section 4.3 (page 362)

Vocabulary Check (page 362)

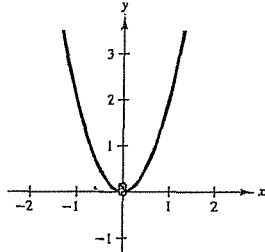
1. conic or conic section
2. circle; $(h, k); r$
3. parabola; directrix; focus
4. vertex
5. axis
6. ellipse; foci
7. major axis; center
8. minor axis
9. hyperbola; foci
10. transverse axis; center

1. Not shown
2. c
3. e
4. a
5. Not shown
6. h
7. f
8. b
9. d
10. g

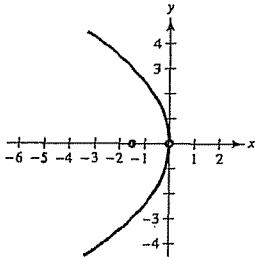
11. Vertex: $(0, 0)$
Focus: $(0, \frac{1}{2})$



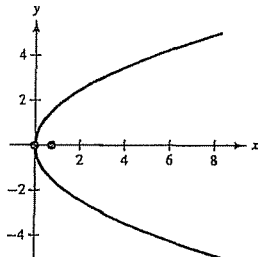
12. Vertex: $(0, 0)$
Focus: $(0, \frac{1}{8})$



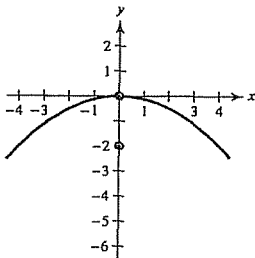
13. Vertex: $(0, 0)$
Focus: $(-\frac{3}{2}, 0)$



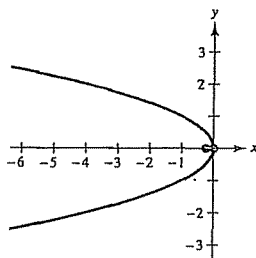
14. Vertex: $(0, 0)$
Focus: $(\frac{3}{4}, 0)$



15. Vertex: $(0, 0)$
Focus: $(0, -2)$



16. Vertex: $(0, 0)$
Focus: $(-\frac{1}{4}, 0)$



17. $y^2 = -8x$
18. $x^2 = -8y$
19. $x^2 = -6y$
20. $y^2 = 10x$
21. $x^2 = 4y$
22. $x^2 = -8y$
23. $y^2 = -12x$
24. $y^2 = 8x$
25. $y^2 = 9x$
26. $x^2 = -2y$
27. $x^2 = \frac{3}{2}y$; Focus: $(0, \frac{3}{8})$
28. $y^2 = -18x$; Focus: $(-\frac{9}{2}, 0)$

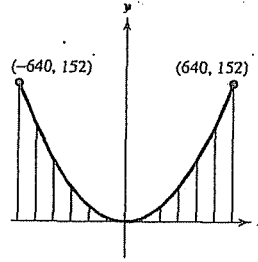
29. $y^2 = \frac{9}{5}x$; Focus: $(\frac{9}{20}, 0)$

30. $x^2 = -16y$; Focus: $(0, -4)$

31. $y^2 = 6x$

32. $y = \frac{1}{14}x^2$

33. (a)



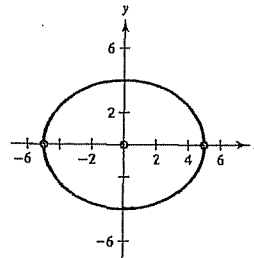
(b) $y = \frac{19x^2}{51,200}$

(c)

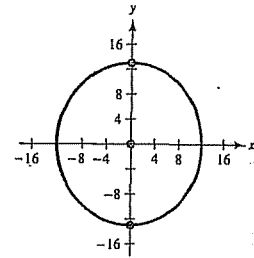
Distance, x	0	200	400	500	600
Height, y	0	$14\frac{27}{32}$	$59\frac{3}{8}$	$92\frac{99}{128}$	$133\frac{19}{32}$

34. (a) $y = \frac{x^2}{12,288}$ (b) 22.6 feet

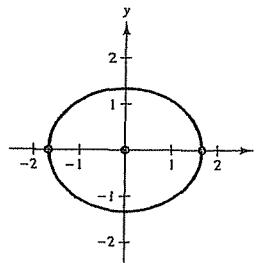
35. Center: $(0, 0)$
Vertices: $(\pm 5, 0)$



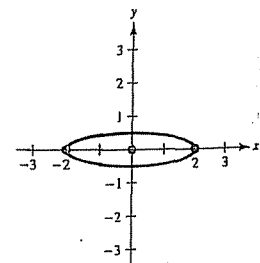
36. Center: $(0, 0)$
Vertices: $(0, \pm 13)$



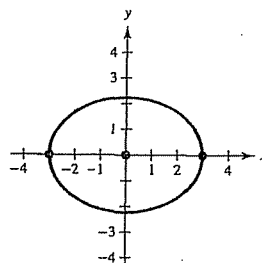
37. Center: $(0, 0)$
Vertices: $(\pm \frac{5}{3}, 0)$



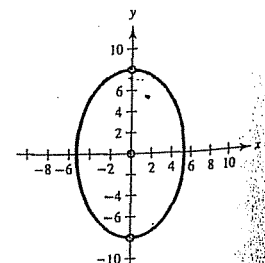
38. Center: $(0, 0)$
Vertices: $(\pm 2, 0)$



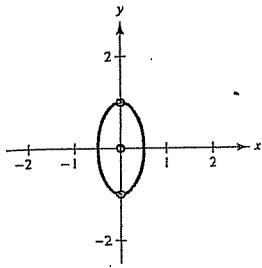
39. Center: $(0, 0)$
Vertices: $(\pm 3, 0)$



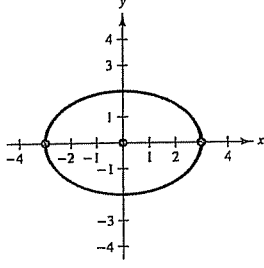
40. Center: $(0, 0)$
Vertices: $(0, \pm 8)$



41. Center: (0, 0)
Vertices: (0, ±1)



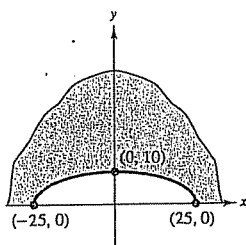
42. Center: (0, 0)
Vertices: (±3, 0)



43. $\frac{x^2}{1} + \frac{y^2}{4} = 1$ 44. $\frac{x^2}{25} + \frac{y^2}{36} = 1$
 45. $\frac{x^2}{4} + \frac{y^2}{9/4} = 1$ 46. $\frac{x^2}{49} + \frac{y^2}{49/4} = 1$
 47. $\frac{x^2}{25} + \frac{y^2}{21} = 1$ 48. $\frac{x^2}{48} + \frac{y^2}{64} = 1$
 49. $\frac{x^2}{36} + \frac{y^2}{11} = 1$ 50. $\frac{x^2}{16} + \frac{y^2}{12} = 1$
 51. $\frac{21x^2}{400} + \frac{y^2}{25} = 1$ 52. $\frac{x^2}{4} + \frac{y^2}{16} = 1$

53. $(\pm\sqrt{5}, 0)$; Length of string: 6 feet

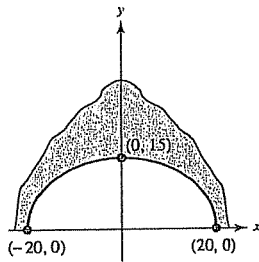
54. (a)



(b) $y = \frac{2}{5}\sqrt{625 - x^2}$

(c) Yes, with clearance of 0.87 foot.

55. (a)

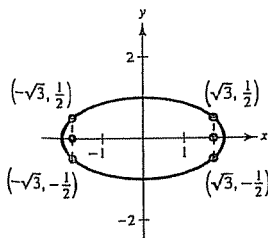


(b) $y = \frac{3}{4}\sqrt{400 - x^2}$

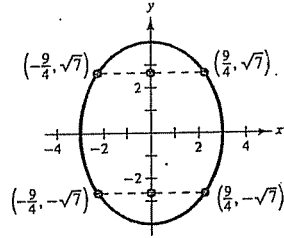
(c) Yes, with clearance of 0.52 foot.

56. Answers will vary.

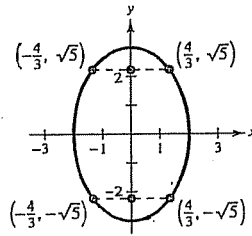
57.



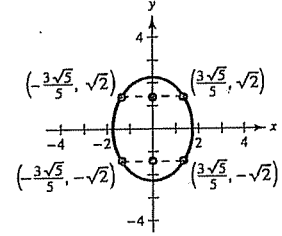
58.



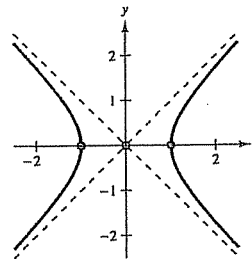
59.



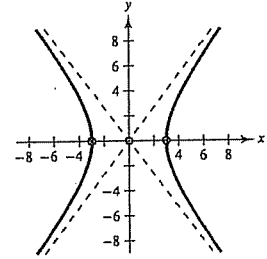
60.



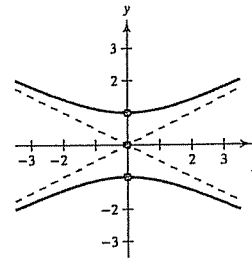
61. Center: (0, 0)
Vertices: (±1, 0)



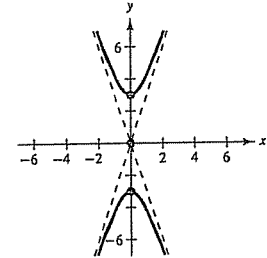
62. Center: (0, 0)
Vertices: (±3, 0)



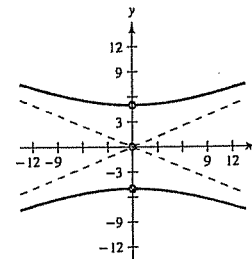
63. Center: (0, 0)
Vertices: (0, ±1)



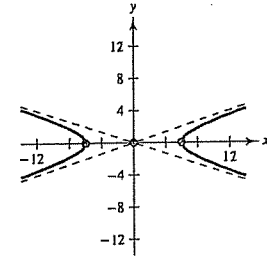
64. Center: (0, 0)
Vertices: (0, ±3)



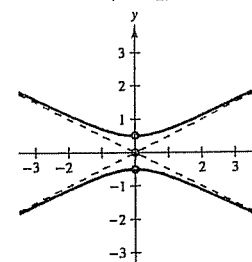
65. Center: (0, 0)
Vertices: (0, ±5)



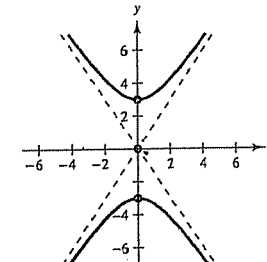
66. Center: (0, 0)
Vertices: (±6, 0)



67. Center: (0, 0)
Vertices: $(0, \pm\frac{1}{2})$



68. Center: (0, 0)
Vertices: $(0, \pm\frac{1}{3})$



69. $\frac{y^2}{4} - \frac{x^2}{12} = 1$ 70. $\frac{x^2}{9} - \frac{y^2}{16} = 1$ 71. $\frac{x^2}{1} - \frac{y^2}{9} = 1$

72. $\frac{y^2}{9} - x^2 = 1$ 73. $\frac{17y^2}{1024} - \frac{17x^2}{64} = 1$

74. $\frac{x^2}{64} - \frac{y^2}{36} = 1$ 75. $\frac{y^2}{9} - \frac{x^2}{9/4} = 1$

76. $\frac{x^2}{4} - \frac{y^2}{12/5} = 1$

77. ~~(a) $\frac{x^2}{1} - \frac{y^2}{56.25} = 1$ (b) 2.405 feet~~ See below

78. $(12(\sqrt{5} - 1), 0) \approx (14.83, 0)$ 79. 10 miles

80. $x \approx 110.3$ miles

81. False. The equation represents a hyperbola:

$$\frac{x^2}{144} - \frac{y^2}{144} = 1.$$

82. True. The denominator of the y^2 -term is larger than the denominator of the x^2 -term.

83. False. If the graph crossed the directrix, there would exist points nearer the directrix than the focus.

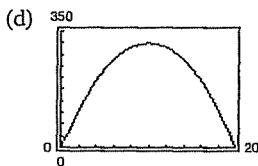
84. (a) $A = \pi a(20 - a)$

(b) $\frac{x^2}{196} + \frac{y^2}{36} = 1$

(c)

a	8	9	10	11	12	13
A	301.6	311.0	314.2	311.0	301.6	285.9

$a = 10$, circle



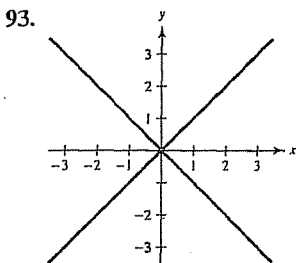
$a = 10$, circle

85. Circle 86. Hyperbola 87. Parabola

88. Ellipse 89. Ellipse 90. Parabola

91. An ellipse is a circle if $a = b$.

92. No. If it were an ellipse, the equation would have to be second degree.



Two intersecting lines

94. (a) Left half of ellipse (portion to the left of the y-axis)

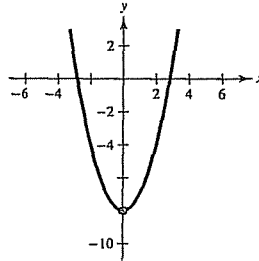
(b) Top half of ellipse (portion above the x-axis)

95. Answers will vary.

96. The shape continuously changes from an ellipse with a vertical major axis of length 8 and a minor axis of length 2 to a circle with a diameter of 8 and then to an ellipse with a horizontal major axis of length 16 and a minor axis of length 8.

97-98. Answers will vary.

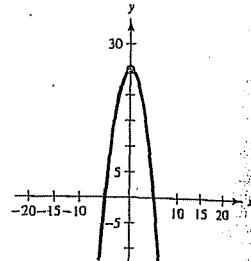
99.



Vertex: $(0, -8)$

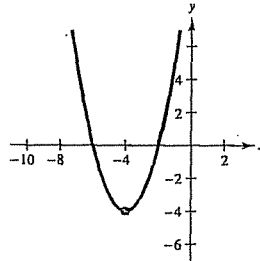
100.

100.



Vertex: $(0, 25)$

101.



Vertex: $(-4, -4)$

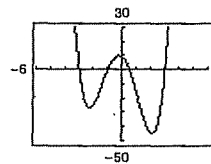
103. $x^3 - 7x^2 + 17x - 15$

104. $\pm 5i, \frac{3}{2}$

105. $\pm 1, \pm 2, \pm 4, \pm 5, \pm 10, \pm 20, \pm \frac{1}{2}, \pm \frac{5}{2}, \pm \frac{1}{3}, \pm \frac{2}{3},$

$\pm \frac{4}{3}, \pm \frac{5}{3}, \pm \frac{10}{3}, \pm \frac{20}{3}, \pm \frac{1}{6}, \pm \frac{5}{6}$

106.



$\pm 3, \frac{1}{2}, -1$

Vertex: $(2, -25)$

(77) a) $x^2 - \frac{3y^2}{169} = 1$

$x^2 - \frac{y^2}{56.33} = 1$

b) 2.92 feet

(75) $\frac{y^2}{9} - \frac{4x^2}{9} = 1$