page 559 # 2-38 even, 44, 46, 50, 52, 54

2. co-vertex at $(0,1)$ & $(0,-1)$ $b = 1$
vertex at $(2,0)$ & $(-2,0)$ $a = 2$
horizontal ellipse because $2 > 1$ & 2 is x-coordinate

$$\frac{x^2}{4} + \frac{y^2}{1} = 1$$

10. $h = 32$ ft vertical ellipse because $h > w$
$w = 16$ ft

$2a = h$ $2b = w$ $\frac{x^2}{64} + \frac{y^2}{256} = 1$
$2a = 32$ $2b = 16$
$a = 16$ $b = 8$

18. $\frac{x^2}{4} + \frac{y^2}{9} = 1$ vertical ellipse. vertices at $(0,3)$ & $(0,-3)$
co-vertices at $(2,0)$ & $(-2,0)$

$c^2 = a^2 - b^2$
$c^2 = 9 - 4$ foci at $(0, \sqrt{5})$ & $(0, -\sqrt{5})$
$c^2 = 5$
$c = \sqrt{5}$ along vertical axis see graph paper

28. foci $(0, \pm 8)$ co-vertices $(\pm 8, 0)$
↑ b
vertical ellipse

$c^2 = a^2 - b^2$
$8^2 = a^2 - 8^2$
$64 = a^2 - 64$
$128 = a^2$

$\frac{x^2}{64} + \frac{y^2}{128} = 1$

÷64 to get 1

34. $16x^2 + 4y^2 = 64$

Put in standard form

$\frac{16x^2}{64} + \frac{4y^2}{64} = 1$

$\frac{x^2}{4} + \frac{y^2}{16} = 1$

↑ vertical ellipse

$c^2 = a^2 - b^2$

$c^2 = 16 - 4$

$c^2 = 12$

$c = \pm 2\sqrt{3}$

$(0, 2\sqrt{3})$ & $(0, -2\sqrt{3})$

44. vertices $(-3,0)$ & $(3,0)$ $3 > 2$ horizontal

co-vertices $(0,-2)$ & $(0,2)$

$\frac{x^2}{9} + \frac{y^2}{4} = 1$

50. focus $(1,0)$ width 4 horizontal ellipse

$2a = w$

$2a = 4$

$a = 2$

$a^2 = 4$

$c^2 = a^2 - b^2$

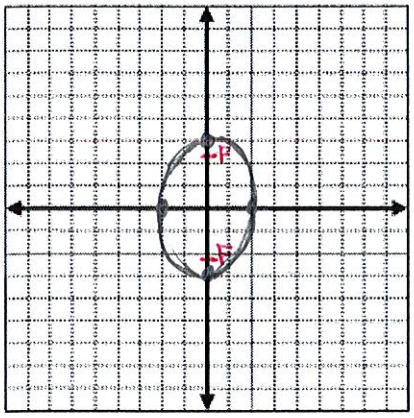
$1 = 4 - b^2$

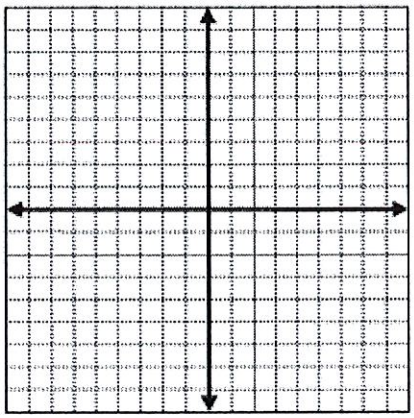
$-3 = -b^2$

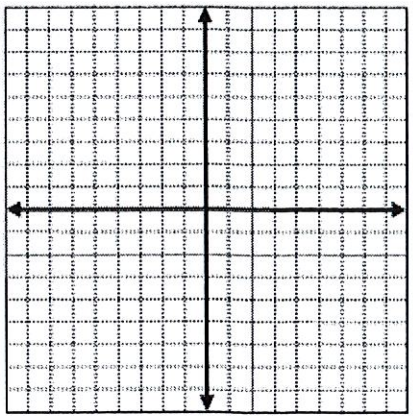
$3 = b^2$

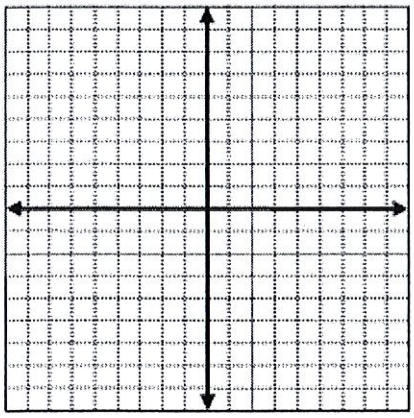
$\frac{x^2}{4} + \frac{y^2}{3} = 1$

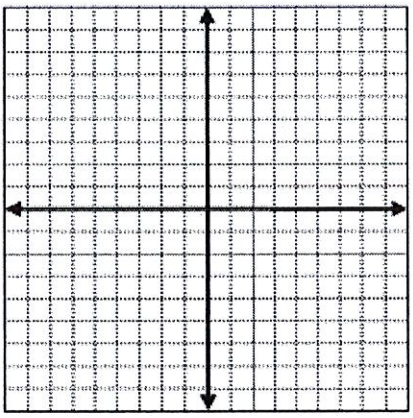
18.

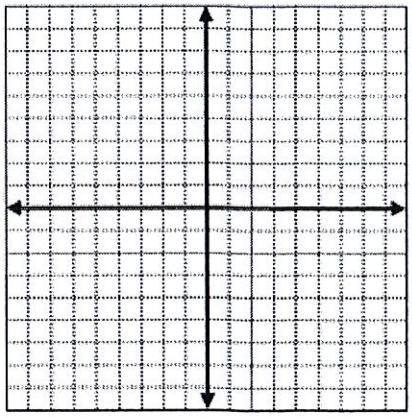


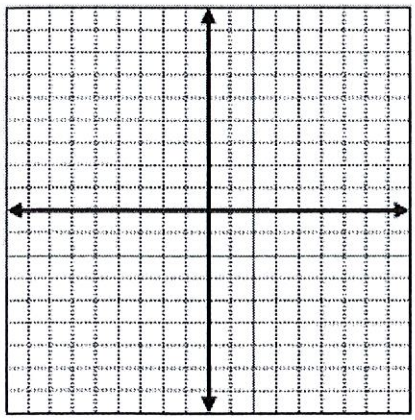


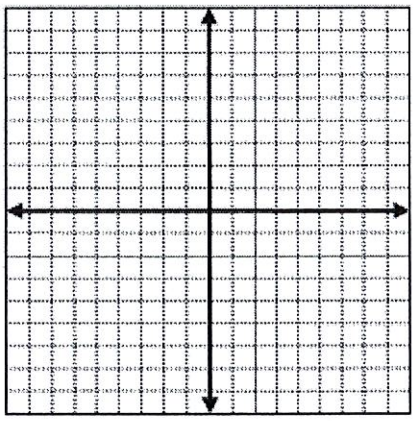


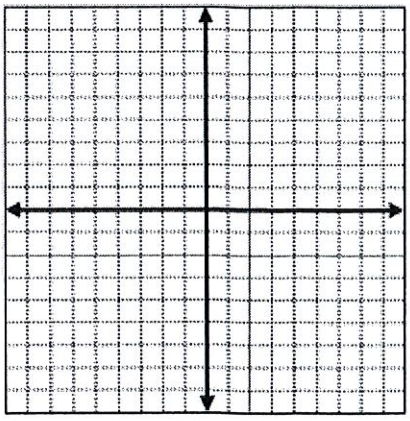


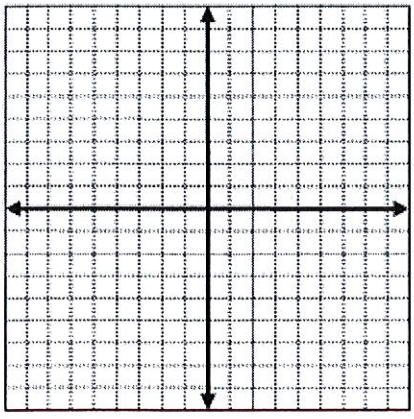


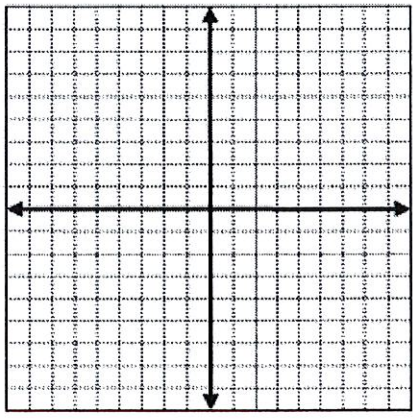












1. $\frac{x^2}{16} + \frac{y^2}{9} = 1$

2. $\frac{x^2}{4} + y^2 = 1$

3. $\frac{x^2}{9} + y^2 = 1$

4. $x^2 + \frac{y^2}{36} = 1$

5. $\frac{x^2}{16} + \frac{y^2}{49} = 1$

6. $\frac{x^2}{36} + \frac{y^2}{25} = 1$

7. $\frac{x^2}{81} + \frac{y^2}{4} = 1$

8. $\frac{x^2}{9} + \frac{y^2}{25} = 1$

9. $\frac{x^2}{2.25} + \frac{y^2}{0.25} = 1$

10. $\frac{x^2}{64} + \frac{y^2}{256} = 1$

11. $\frac{x^2}{36} + \frac{y^2}{100} = 1$

12. $\frac{x^2}{12.25} + \frac{y^2}{25} = 1$

13. $\frac{x^2}{196} + \frac{y^2}{49} = 1$

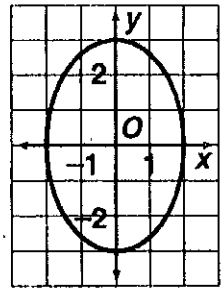
14. $x^2 + \frac{y^2}{16} = 1$

15. $\frac{x^2}{256} + \frac{y^2}{56.25} = 1$

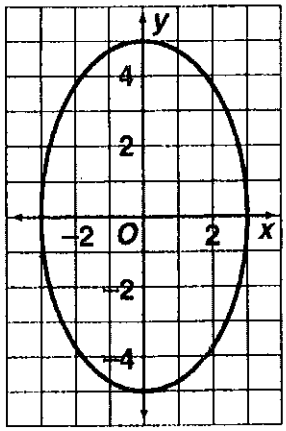
16. $\frac{x^2}{900} + \frac{y^2}{400} = 1$

17. $x^2 + \frac{y^2}{6.25} = 1$

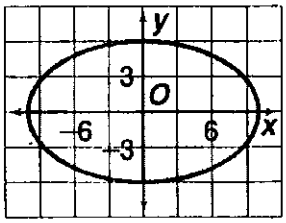
18. $(0, \sqrt{5}), (0, -\sqrt{5})$



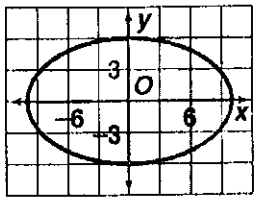
19. $(0, 4), (0, -4)$



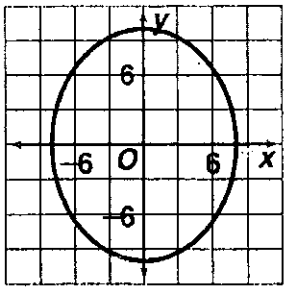
20. $(4\sqrt{2}, 0), (-4\sqrt{2}, 0)$



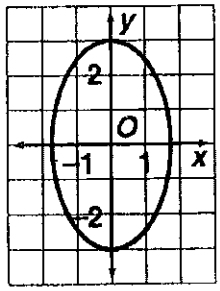
21. $(8, 0), (-8, 0)$



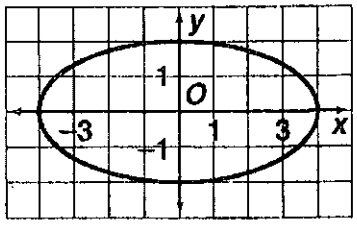
22. $(0, 6), (0, -6)$



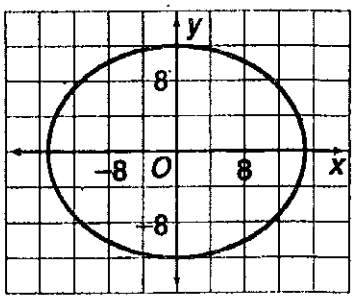
23. $(0, \sqrt{6}), (0, -\sqrt{6})$



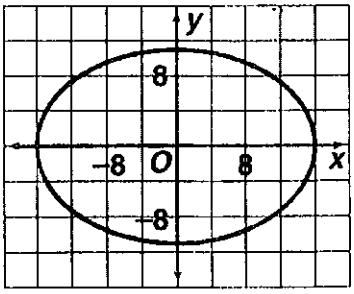
24. $(2\sqrt{3}, 0), (-2\sqrt{3}, 0)$



25. $(9, 0), (-9, 0)$



26. $(3\sqrt{15}, 0), (-3\sqrt{15}, 0)$



27. $\frac{x^2}{100} + \frac{y^2}{64} = 1$

28. $\frac{x^2}{64} + \frac{y^2}{128} = 1$

29. $\frac{x^2}{89} + \frac{y^2}{64} = 1$

30. $\frac{x^2}{4} + \frac{y^2}{20} = 1$

31. $\frac{x^2}{245} + \frac{y^2}{49} = 1$

32. $\frac{x^2}{514} + \frac{y^2}{225} = 1$

33. $(\sqrt{5}, 0), (-\sqrt{5}, 0)$

34. $(0, 2\sqrt{3}), (0, -2\sqrt{3})$

35. $(0, 4\sqrt{2}), (0, -4\sqrt{2})$

36. $(0, \sqrt{21}), (0, -\sqrt{21})$

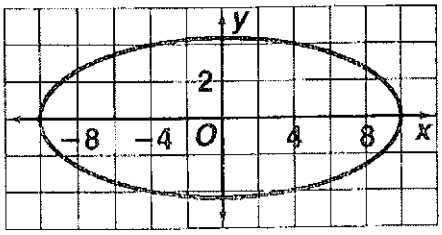
37. $(0, 2\sqrt{7}), (0, -2\sqrt{7})$

38. $(0, 1), (0, -1)$

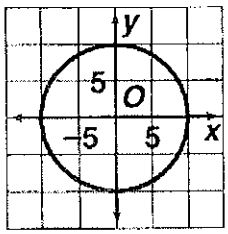
39. $(-3, 8), (-3, 2)$

40. $(-2, \sqrt{2}), (-2, -\sqrt{2})$

41. a. 0.9;



b. 0.1;



c. The shape is close to a circle.

d. The shape is close to a line segment.

42. $\frac{x^2}{20.25} + \frac{y^2}{4} = 1$

43. a. Yes; since $c^2 = a^2 - b^2$, if the foci are close to 0, then c^2 will be close to 0 and a^2 will be close to b^2. This means a will be close to b and hence the ellipse will be close to a circle.

b. If F_1 and F_2 are considered distinct pts., then a circle is not an ellipse. If F_1 and F_2 are the same pt., then a circle is an ellipse.

44. $\frac{x^2}{9} + \frac{y^2}{4} = 1$

45. $\frac{x^2}{16} + y^2 = 1$

46. $x^2 + \frac{y^2}{9} = 1$

47. $\frac{x^2}{4} + \frac{y^2}{16} = 1$

48. The vertices are the points farthest from the center and the co-vertices are the points closest to the center.

49. Check students' work.

50. $\frac{x^2}{4} + \frac{y^2}{3} = 1$

51. $\frac{x^2}{25} + \frac{y^2}{4} = 1$

/24

52. $\frac{x^2}{121} + \frac{y^2}{81} = 1$

53. $\frac{x^2}{702.25} + \frac{y^2}{210.25} = 1$

54. $\frac{x^2}{169} + \frac{y^2}{144} = 1$

55. $\frac{x^2}{256} + \frac{y^2}{324} = 1$

56. $\frac{x^2}{72.25} + \frac{y^2}{90.25} = 1$

57. $\frac{x^2}{400} + \frac{y^2}{100} = 1$

58. $\frac{x^2}{16} + \frac{y^2}{12} = 1$

59. $\frac{x^2}{16} + \frac{y^2}{25} = 1$

60. $\frac{x^2}{39} + \frac{y^2}{64} = 1$

61. $\frac{x^2}{36} + \frac{y^2}{27} = 1$

62. $\frac{x^2}{4} + \frac{y^2}{9} = 1$

63. $\frac{x^2}{18} + \frac{y^2}{20} = 1$

64. a. The vertices are at the points where the curve intersects the line through the holes made by the tacks. The co-vertices are the points where the curve intersects the perpendicular bisector of the segment connecting the vertices.

b. at the points where the tacks are stuck in the paper

c. Check students' work.

65. When c is close to 0, the values of a and b are almost the same, and πab is close to πa^2, that is, close to the area of a circle of radius a.

66. a. 3×10^6 mi

b. about 0.016

c. $\frac{x^2}{8.649 \times 10^{15}} + \frac{y^2}{8.64675 \times 10^{15}} = 1$

67. area of blue region = 3(area of white region)

68. $10\sqrt{799}$ or about 282.7 ft

69. D **70.** I **71.** C