



5.1 Conic Sections 2018-19

Identify each equation as a parabola (p), hyperbola (h), ellipse (e), or circle (c).

h 1. $\frac{y^2}{4} - \frac{x^2}{25} = 1$

p 2. $3x^2 + 2x - 4x^2 = 12$

c 3. $(x+2)^2 + (y-3)^2 = 4$

p 4. $y = 8(x-7)^2 + 10$

c 5. $x^2 + 3x + y^2 + 8x = 25$ $a=c$

p 6. $3x^2 - 4x + 3y + 2x - 50 = 0$

h 7. $3y^2 - 2x^2 = 12$

e 8. $\frac{x^2}{256} + \frac{y^2}{1} = 1$

p 9. $3x - 3y^2 = 36$

h 10. $-y^2 + 2x + 3x^2 - 40 = 0$

e 11. $5x^2 + 25x + 3y^2 - 6y + 30 = 0$ $a < b < c$

h 12. $y^2 - x^2 = 4$

p 13. $y = -3x^2 - 4$

c 14. $(x-6)^2 + (y-6)^2 = 144$

c 15. $x^2 + y^2 = 9$

p 16. $x + y^2 - 2 = 0$

h 17. $\frac{x^2}{121} - \frac{y^2}{9} = 1$

e 18. $\frac{x^2}{169} + \frac{y^2}{144} = 1$

h 19. $\frac{x^2}{9} - \frac{y^2}{144} = 1$

p 20. $x - 3(y-1)^2 = 4$

h 21. $\frac{y^2}{9} - \frac{x^2}{16} = 1$

h 22. $\frac{x^2}{36} - \frac{y^2}{16} = 1$

e 23. $\frac{x^2}{100} + \frac{y^2}{36} = 1$

p 24. $0 = 2(x-1)^2 + 1 - y$

c 25. $\left(x + \frac{2}{9}\right)^2 + \left(y + \frac{5}{9}\right)^2 = \frac{4}{9}$

e 26. center is (3, 4); foci at (5, 4) & (1, 4); vertices at (8, 4) and (-2, 4)

p 27. vertex (2, 6); opens up; focus (2, 7) directrix is $y = 5$

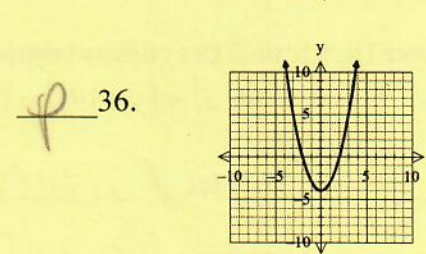
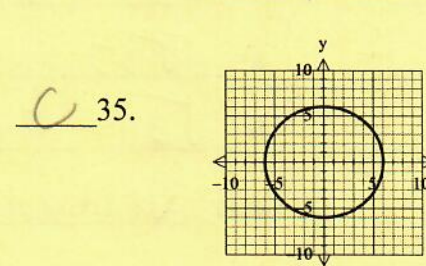
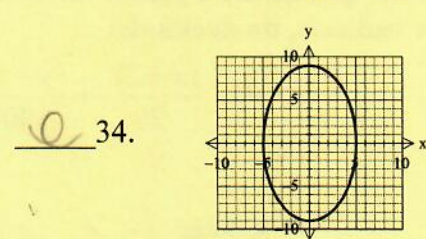
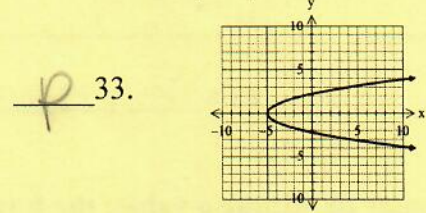
h 28. center is (0, 0); asymptotes $y = \pm \frac{3}{4}x$. Vertices (4, 0) & (-4, 0).

p 29. vertex is (-2, 2); opens down; focus (-2, 0); directrix $y = 4$

c 30. center is (-2, -6); $r = 4$

h 31. center is (0, 0); The asymptotes are $y = \pm \frac{1}{2}x$; vertices (0, 5) & (0, -5).

p 32. vertex is (2, 4); opens right; focus (3, 4); directrix is $x = 1$



Parabolas – Identify the direction of opening, focal width (4p) and the vertex (h, k) for each equation (make sure it is in the correct form).

37. $(x-3)^2 = 6(y+10)$

Opens up

Focal Width 6

Vertex (3, -10)

38. $\frac{1}{2}(x-12) = (y+17)^2$

Opens right

Focal Width 1/2

Vertex (12, -17)

39. $y = -\frac{1}{2}(x-3)^2 + 10$

Opens down

Focal Width 2

Vertex (3, 10)

Hyperbolas – Identify the center (h, k); the a value; the b value; and whether the transverse axis is vertical or horizontal. (simplify the radicals, no decimals)

40. $\frac{y^2}{4} - \frac{x^2}{25} = 1$

Center (0, 0)

a = 2

b = 5

axis vertical

41. $\frac{(x+1)^2}{100} - \frac{y^2}{49} = 1$

Center (-1, 0)

a = 10

b = 7

axis horizontal

42. $\frac{4(x-10)^2}{12} - \frac{6(y+1)^2}{12} = \frac{12}{12}$

Center (10, -1)

a = $\sqrt{3}$

b = $\sqrt{2}$

axis horizontal

Ellipse – Identify the center (h, k); the a value; the b value; and whether the major axis is vertical or horizontal. (simplify the radicals, no decimals)

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

Center (0, 0)

a = 13

b = 12

axis horizontal

44. $\frac{(x+2)^2}{20} + \frac{(y-6)^2}{30} = 1$

Center (-2, 6)

a = $\sqrt{30}$

b = $\sqrt{20} = 2\sqrt{5}$

axis vertical

45. $\frac{8(x-7)^2}{16} + \frac{(y+4)^2}{16} = \frac{16}{16}$

Center (7, -4)

a = 4

b = $\sqrt{2}$

axis vertical

Circle – Identify the center (h, k); and the radius (simplify the radicals, no decimals)

46. $(x+2)^2 + (y-3)^2 = 4$

Center (-2, 3)

radius 2

47. $x^2 + (y+19)^2 = 18$

Center (0, -19)

radius $\sqrt{18} = 3\sqrt{2}$

$\frac{9^2}{3^2}$

48. $x^2 + y^2 = 20$

Center (0, 0)

radius $\sqrt{20} = 2\sqrt{5}$