

Writing a conic from general form to standard form

1st Recognize the conic

$$Ax^2 + Cy^2 + Dx + Ey + F = 0$$

$$A, C, D, E, F \in \mathbb{I}$$

$A = C$
circle

$A \neq C$
 $AC > 0$
(A & C have the same sign)
ellipse

A or $C = 0$
parabola

$AC < 0$
(A & C have opposite signs)

2nd Make perfect squares to get
into standard form

p. 168

38. $x^2 - 4y^2 + 6x - 8y - 11 = 0$

Hyperbola

$$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = \pm 1$$

$$x^2 + 6x - 4y^2 - 8y = 11$$

$$x^2 + 6x + 9 - 4(y^2 + 2y) = 11 + 9$$

$$(x+3)^2 - 4(y^2 + 2y + 1) = 11 + 9 - 4$$

$$(x+3)^2 - 4(y+1)^2 = 16$$

$$\frac{(x+3)^2}{16} - \frac{(y+1)^2}{4} = 1$$

$$34. \quad 16x^2 + 25y^2 - 400 = 0$$

$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$

$$\frac{16x^2}{400} + \frac{25y^2}{400} = \frac{400}{400}$$

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



$$41. \quad 4x^2 + 25y^2 - 24x + 200y + 336 = 0$$

$$4x^2 - 24x + 25y^2 + 200y = -336$$

$$4(x^2 - 6x) + 25(y^2 + 8y) = -336$$

$$4(x^2 - 6x + 9) + 25(y^2 + 8y + 16) = -336 + 36 + 400$$

$$\frac{4(x-3)^2}{100} + \frac{25(y+4)^2}{100} = \frac{100}{100}$$

$$\frac{(x-3)^2}{25} + \frac{(y+4)^2}{4} = 1$$

$$3x^2 + 24x + 2y + 54 = 0$$

$$3x^2 + 24x = -2y - 54$$

$$y - k = a(x - h)^2$$

$$3(x^2 + 8x) = -2y - 54$$

$$3(x^2 + 8x + 16) = -2y - 54 + 48$$

$$\frac{3(x+4)^2}{-2} = \frac{-2y-6}{-2}$$

$$-\frac{3}{2}(x+4)^2 = y+3$$