

Day 6: Converting General Form to Standard Form

Recall from Pure Math 20 how to complete the square:

Determine the value of C

$$y = |x^2 + 2x + C$$

+1 +1 - 1
(1)²

$$y = |x^2 + 12x + C$$

6 ± 36

$$y = -2x^2 - 8x + C$$

$$y = -2(x^2 + 4x + 4 - 4)$$

+2

Steps to complete the square:

- 1) Group the variables together and factor out the coefficient of the term where the variable is squared.
- 2) Add and subtract the square of half the variable term's coefficient inside the bracket (in which variables are grouped).
- 3) Remove the negative constant from the bracket by multiplying by the bracket's coefficient and combining with the constant outside the bracket.
- 4) Factor the perfect square trinomial.

Which equation would be easier to graph without using a graphing calculator:

$$\frac{(x-2)^2}{9} + \frac{(y-1)^2}{16} = 1 \text{ or } \underline{16x^2 + 9y^2 - 64x - 18y - 71 = 0?}$$

$$(16x^2 - 64x) + (9y^2 - 18y) - 71 = 0$$

$$16(x^2 - 4x + 4 - 4) + 9(y^2 - 2y + 1 - 1) - 71 = 0$$

$$16(x^2 - 4x + 4) - 64 + 9(y^2 - 2y + 1) - 9 - 71 = 0$$

$$16(x-2)^2 + 9(y-1)^2 - 64 - 9 - 71 = 0$$

$$\frac{16(x-2)^2}{144} + \frac{9(y-1)^2}{144} = 1$$

$$\frac{(x-2)^2}{9} + \frac{(y-1)^2}{16} = 1$$

Converting from General Form to Standard Form:

Eg 3) Describe and sketch the following conic without a graphing calculator:

$$25x^2 + 4y^2 - 50x + 24y - 39 = 0$$

$$25(x^2 - 2x + 1 - 1) + 4(y^2 + 6y + 9 - 9) - 39 = 0$$

$$25(x-1)^2 - 25 + 4(y+3)^2 - 36 - 39 = 0$$

$$25(x-1)^2 + 4(y+3)^2 = 100$$

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

Eg 4) Describe and sketch the following conic without a graphing calculator:

$$3y^2 - x - 12y + 7 = 0$$

$$(3y^2 - 12y) - x + 7 = 0$$

$$3(y^2 - 4y + 4 - 4) - x + 7 = 0$$

$$3(y - 2)^2 - 12 - x + 7 = 0$$

$$3(y - 2)^2 - x - 5 = 0$$

$$3(y - 2)^2 = x + 5$$

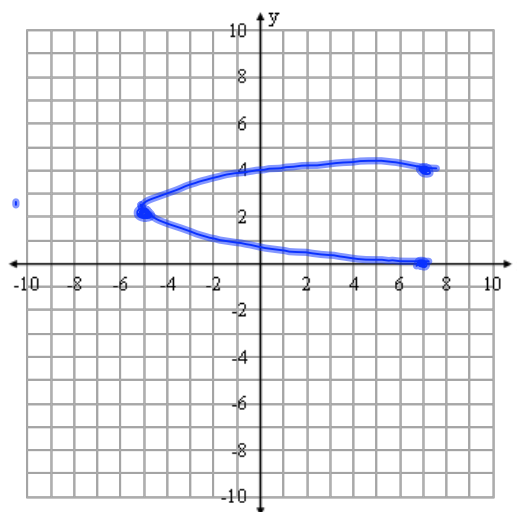
Vertex: (-5, 2)
open right

$$3(0 - 2)^2 = x + 5$$

$$12 = x + 5$$

$$x = 7$$

$$(7, 0)$$



Assignment:
Pg. 563 #1-3

→ odds