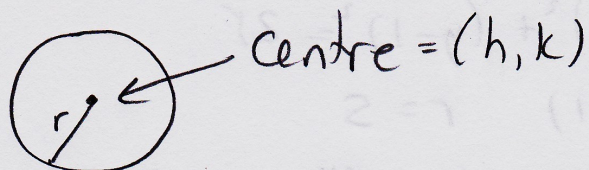


2.4 Circles

p.1



radius = r

Let (x, y) be any point on circle
Consider distance from (h, k) to (x, y) :

$$\sqrt{(x-h)^2 + (y-k)^2} = r$$

$$(x-h)^2 + (y-k)^2 = r^2$$

Standard Form

Ex : Write the standard form

a) radius = 4 Centre = origin

$$r = 4 \quad (h, k) = (0, 0)$$

$$x^2 + y^2 = 16$$

b) radius = $3\sqrt{3}$ Centre = $(-2, 3)$

$$r = 3\sqrt{3}$$

$$(h, k) = (-2, 3)$$

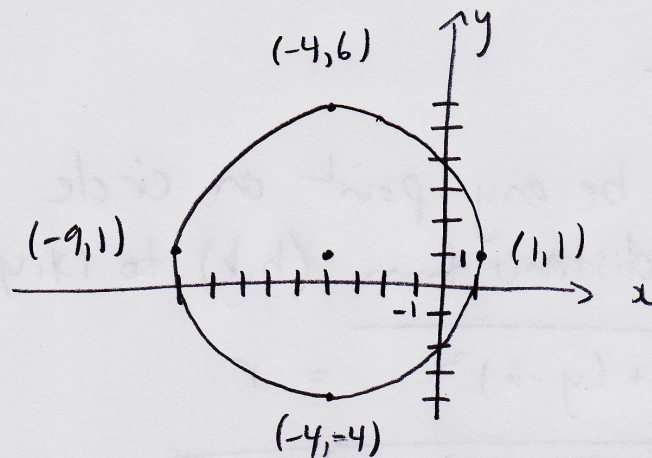
$$r^2 = 9 \cdot 3 = 27$$

$$(x+2)^2 + (y-3)^2 = 27$$

Ex: Graph $3(x+4)^2 + 3(y-1)^2 = 75$

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

Centre = $(-4, 1)$ $r = 5$



Ex: Find the x-intercepts (above)

Set $y=0$ in $(x+4)^2 + (y-1)^2 = 25$

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

$$(x+4)^2 = 24$$

$$x+4 = \pm\sqrt{24}$$

$$x = -4 \pm 2\sqrt{6}$$

$$\approx -8.9, 0.9 \quad \checkmark$$

$(-4+2\sqrt{6}, 0)$ and
 $(-4-2\sqrt{6}, 0)$

Ex: Find the standard form

p.3

$$x^2 + y^2 - 8x + 6y - 5 = 0 \quad \leftarrow \text{"general form"}$$

$$x^2 - 8x + y^2 + 6y = 5$$

Complete the square

$$\left(-\frac{8}{2}\right)^2 = 16$$

$$\left(\frac{6}{2}\right)^2 = 9$$

$$x^2 - 8x + 16 + y^2 + 6y + 9 = 5 + 16 + 9$$

$$(x-4)^2 + (y+3)^2 = 30$$

$$(x-4)^2 + (y+3)^2 = \sqrt{30}^2$$