

# M8 = 23 days to go!

5 A one gram bag of seed contains half a million seeds.

If each seed weighs the same, calculate the weight, in grams, of one seed.

Give your answer in standard form.

$$1\text{g} = 500000 \text{ seeds}$$

$$1\text{g} = 5 \times 10^5 \text{ seeds}$$

$$\frac{1}{5 \times 10^5} = 1 \text{ seed}$$

Answer  $\underline{2 \times 10^{-6}} \text{ g [3]}$

$$\frac{1}{5} \times 10^{-5}$$

$$0.2 \times 10^{-5}$$

$$2 \times 10^{-1} \times 10^{-5}$$

$$2 \times 10^{-6}$$

Remember  $a \times 10^n$

must be  
between  
1 and 10

$n$  is positive big nos.

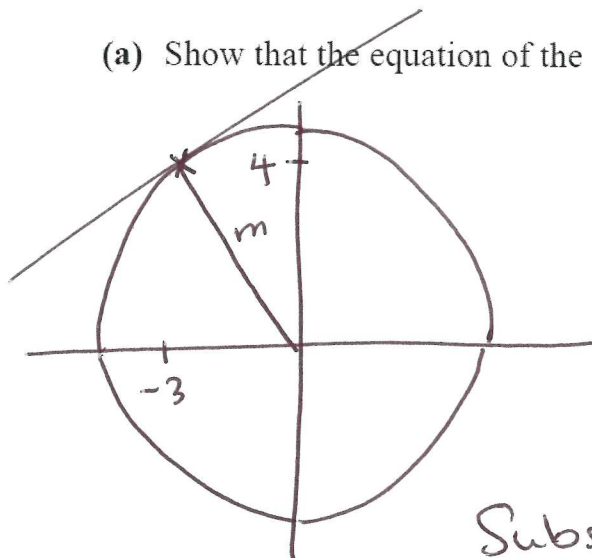
$n$  is negative small nos.

$$x^2 + y^2 = 5^2$$

11  $(-3, 4)$  is a point on the circle  $x^2 + y^2 = 25$

Circle centre  $(0, 0)$   
radius 5

(a) Show that the equation of the tangent to the circle at this point is  $4y = 3x + 25$



$$m = \frac{\text{rise}}{\text{run}} = -\frac{4}{3} \text{ of radius.}$$

$$\text{Gradient of tangent} = \frac{3}{4}$$

$$y = \frac{3}{4}x + c$$

Substitute point  $(-3, 4)$  into

$$4 = \frac{3}{4}(-3) + c$$

$$4 = -\frac{9}{4} + c \quad c = \frac{25}{4} \quad [4]$$

(b) Find the coordinates of the points of intersection of this tangent and the curve  $y = x^2 + 6$

$$y = \frac{3}{4}x + \frac{25}{4}$$

and  $y = x^2 + 6$

Simultaneous Equations

$$x^2 + 6 = \frac{3}{4}x + \frac{25}{4}$$

$$4x^2 + 24 = 3x + 25$$

$$4x^2 - 3x - 1 = 0$$

$$(4x + 1)(x - 1)$$

Answer

$$(1, 7) \text{ and } \left(-\frac{1}{4}, 6\frac{1}{16}\right)$$

[6]

$$\left. \begin{array}{l} x = -\frac{1}{4} \\ y = 6\frac{1}{16} \end{array} \right\} \begin{array}{l} x = +1 \\ y = 7 \end{array}$$