

19th January



Corbettmaths

A scientist is carrying out an experiment to remove microplastics from water. In an experiment 80,000 microplastics are added to a sample of water.

The number of microplastics,  $M$ , after  $t$  minutes is  $M = 80000 \times 2^{-t}$

Calculate the number of microplastics in the water after 2 minutes.

$$80000 \times 2^{-2} = 20000$$

After how many complete minutes does it take for the number of microplastics to fall below 100?

$$t = 9 \Rightarrow M = 156.25$$

$$t = 10 \Rightarrow M = 78.125$$

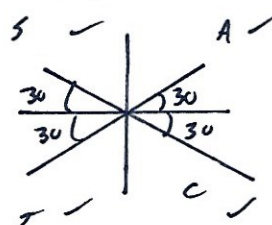
10 minutes

Solve

$$\sin^2 x = \frac{1}{4} \text{ for } 0^\circ \leq x \leq 360^\circ$$

$$\sqrt{\frac{1}{4}} = \pm \frac{1}{2}$$

$$\sin^{-1}\left(\frac{1}{2}\right) = 30^\circ$$



$$x = 30^\circ, 210^\circ, 150^\circ, 330^\circ$$

A curve with equation  $y = x^2 + 8x - 1$  meets the x-axis at the points A and B. The point C has coordinates (2, 5).

Find the area of triangle ABC

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

$$y = (x+4)^2 - 17$$

$$0 = (x+4)^2 - 17$$

$$(x+4)^2 = 17$$

$$x+4 = \pm \sqrt{17}$$

$$x = -4 \pm \sqrt{17}$$

$$x = -4 - \sqrt{17} \text{ or } x = -4 + \sqrt{17}$$

$$A(-4 - \sqrt{17}, 0) \quad B(-4 + \sqrt{17}, 0)$$

$$C(2, 5)$$



$$A = \frac{1}{2} \times (2\sqrt{17}) \times 5$$

$$= 5\sqrt{17}$$