



Prove algebraically that  $0.6\dot{1}\dot{4}$

can be written as  $\frac{304}{495}$

$$x = 0.61414\dots$$

$$10x = 6.1414\dots$$

$$1000x = 614.1414\dots$$

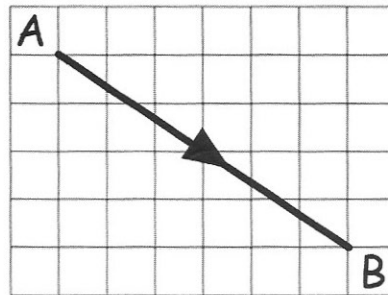
$$990x = 608$$

$$x = \frac{608}{990}$$

$$x = \frac{304}{495}$$

$$\vec{AB} = \begin{pmatrix} 6 \\ -4 \end{pmatrix} \quad \frac{2}{3} \text{ of } \begin{pmatrix} 4 \\ 6 \end{pmatrix} = \begin{pmatrix} 2.6 \\ 4 \end{pmatrix}$$

Write down a vector that is perpendicular to AB and is two thirds of the length of AB.



The population of birds living on an island is decreasing exponentially.

Martin has begun to monitor the population each year.

Year 6 - Population 8000

Year 8 - Population 4000

What was the population in Year 2?

$$8000 \xrightarrow{xy} \xrightarrow{xy} 4000$$

$$8000 \times y^2 = 4000$$

$$y^2 = 0.5$$

$$y = 0.7071\dots$$

$$8000 \times (0.7071\dots)^4$$

$$= 32000$$

Two ships, A and B, leave a port at midday.

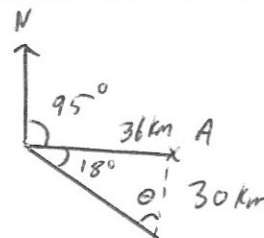
A travels on a bearing of  $095^\circ$  at a speed of 18km/h.

B travels on a bearing of  $113^\circ$  at a speed of  $y$  km/h.

At 14:00 the distance between A and B is 30km.

Boat B was travelling at a slower speed than boat A

Work out  $y$ , the speed of boat B.



$$\frac{\sin \theta}{36} = \frac{\sin 18}{30}$$

$$\theta = 21.716^\circ \text{ or}$$

$$\theta = 158.284^\circ$$

if  $\theta = 21.766^\circ$   $PB = 62.099\dots \text{ km}$

if  $\theta = 158.234^\circ$   $PB = 6.377 \text{ km}$

As speed of A is larger,  $PB = 6.377 \text{ km}$

$$6.377 \div 2 = 3.1885 \text{ km/h}$$

Using cosine rule.