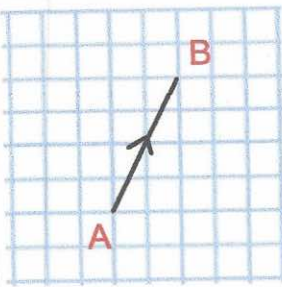


5th August



Corbettmaths



$$\vec{AB} = \begin{pmatrix} 2 \\ 2 \end{pmatrix}$$

Write down a vector that is perpendicular to AB and twice the length

$$\begin{pmatrix} 8 \\ -4 \end{pmatrix}$$

a is directly proportional to \sqrt{c} .
w is inversely proportional to a^3 .

When $c = 49$, $a = 35$
When $a = 2$, $w = 16$.

Find the value of w when $c = 4$.

$$a \propto \sqrt{c}$$

$$a = k\sqrt{c}$$

$$35 = k \times 7$$

$$k = 5$$

$$a = 5\sqrt{c}$$

$$c = 4 \quad a = 10$$

$$w = \frac{k}{a^3}$$

$$16 = \frac{k}{8}$$

$$w = \frac{128}{a^3}$$

$$w = 0.128$$

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?

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

$$y = 0.7071\dots$$

$$8000 \div (0.707\dots)^4 = 32000$$

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

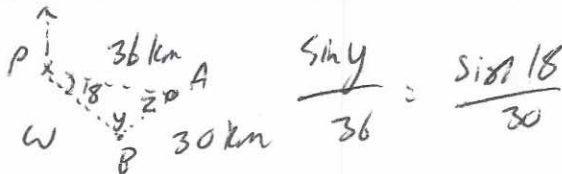
A travels on a bearing of 095° at a speed of 18km/h.

B travels on a bearing of 113° 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.



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

possible values of y

$$= 21.766^\circ \text{ or } 158.234^\circ$$

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

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

} Using Cosine rule

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

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