



17th March

A sequence of numbers is formed by the iterative process

$$a_{n+1} = (a_n)^2 - 5$$

$$a_1 = 3$$

Find

$a_3$

$$\begin{aligned} a_2 &= 3^2 - 5 \\ &= 9 - 5 \\ &= 4 \\ a_3 &= 4^2 - 5 \\ &= 11 \end{aligned}$$

A sculptor wants to transport a piece of rock. It is a sphere with radius 0.4m to the nearest centimetre.

The density of the rock is  $3.4\text{g/cm}^3$  <sup>40cm</sup>  $UB = 0.405\text{m}$   
 The truck can carry up to 1000kg to one significant figure.  $LB = 950\text{kg}$

Can the sculptor safely transport the rock?

Yes

$$\begin{aligned} &\frac{4}{3} \times \pi \times (0.405)^3 \\ &278261.8569 \text{ cm}^3 \\ m &= 946090.3135\text{g} \\ &= 946.09\text{kg} \end{aligned}$$

A remote control car drives in a straight line.

It starts from rest and travels with constant acceleration for 15 seconds reaching a velocity of 10m/s.

It then travels at a constant speed for 5 seconds.

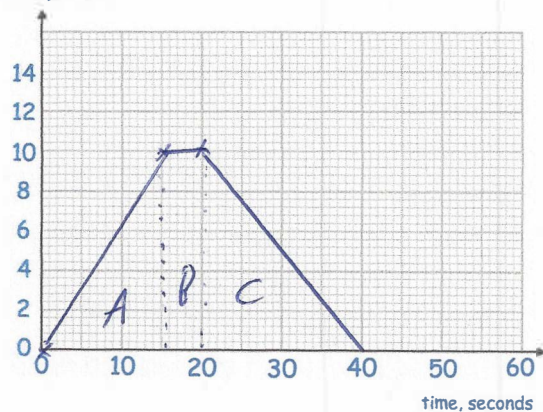
It then slows down with constant deceleration of  $0.5\text{m/s}^2$ .

$$t = \frac{v-u}{a} = \frac{0-10}{-0.5} = 20$$

Draw a velocity-time graph and work out the total distance travelled.

$$225\text{m}$$

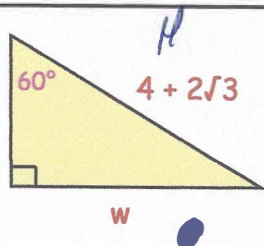
Velocity, m/s



$$A = \frac{1}{2} \times 10 \times 15 = 75$$

$$B = 5 \times 10 = 50$$

$$C = \frac{1}{2} \times 20 \times 10 = 100$$



$S$   $H$

Find the exact length of the side labelled w.

$$\begin{aligned} w &= \sin(60) \times (4 + 2\sqrt{3}) \\ &= \frac{\sqrt{3}}{2} (4 + 2\sqrt{3}) \\ &= 2\sqrt{3} + 3 \end{aligned}$$