



Measures (H)

Intervention Booklet

Similar Length, Area and Volume (LAV)

Things to remember:

- Linear scale factor = x
- Area scale factor = x^2
- Volume scale factor = x^3

Questions:

1. Two cylinders, **P** and **Q**, are mathematically similar.
 The total surface area of cylinder **P** is 90π cm². The total surface area of cylinder **Q** is 810π cm². The length of cylinder **P** is 4 cm.

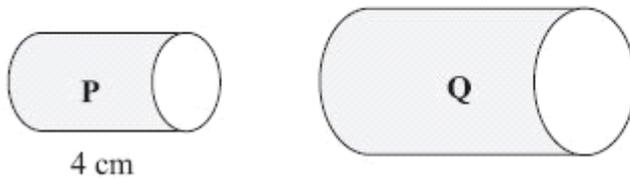


Diagram **NOT** accurately drawn

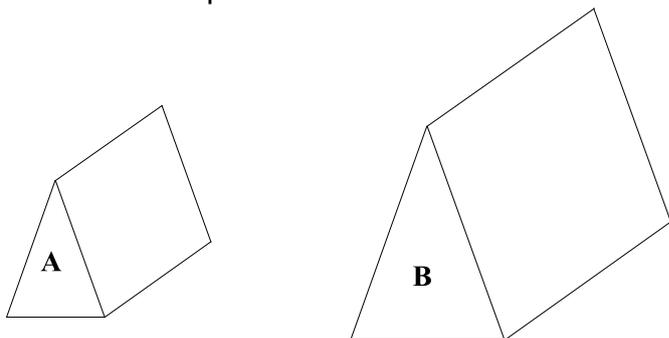
- (a) Work out the length of cylinder **Q**.

..... cm
(3)

- The volume of cylinder **P** is 100π cm³.
 (b) Work out the volume of cylinder **Q**.
 Give your answer as a multiple of π

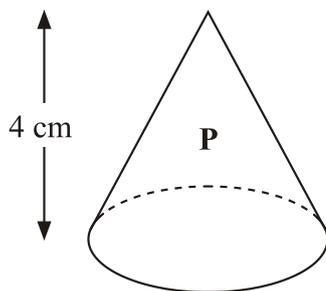
..... cm³
(2)
(Total 5 marks)

2. Diagram **NOT** accurately drawn
 Two prisms, **A** and **B**, are mathematically similar. The volume of prism **A** is 12 000 cm³.
 The volume of prism **B** is 49 152 cm³. The total surface area of prism **B** is 9728 cm².



Calculate the total surface area of prism

3. Diagram **NOT** accurately drawn
 Two cones, **P** and **Q**, are mathematically similar. The total surface area of cone **P** is 24 cm². The total surface area of cone **Q** is 96 cm². The height of cone **P** is 4 cm.



- (a) Work out the height of cone **Q**.

..... cm²
(Total 4 marks)

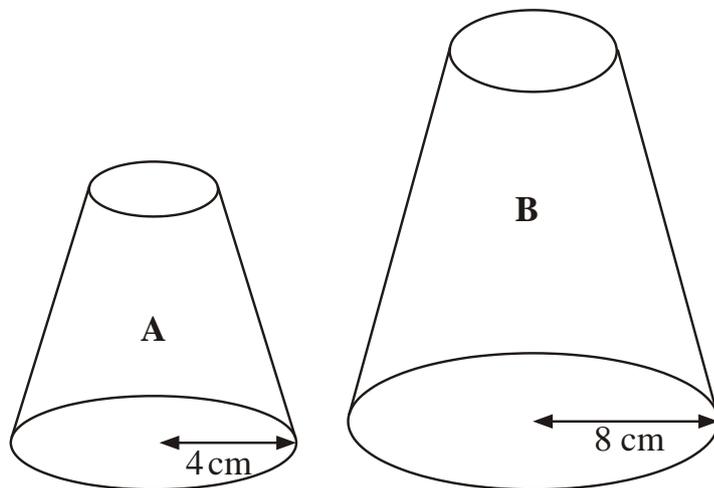
- The volume of cone **P** is 12 cm³.
 (b) Work out the volume of cone **Q**.

..... cm
(3)

..... cm³
(2)
(Total 5 marks)

4. Diagram **NOT** accurately drawn
 Two solid shapes, **A** and **B**, are mathematically similar. The base of shape **A** is a circle with radius 4 cm. The base of shape **B** is a circle with radius 8 cm. The surface area of shape **A** is 80 cm^2 .

- (a) Work out the surface area of shape **B**.



..... cm^2
(2)

The volume of shape **B** is 600 cm^3 .

- (b) Work out the volume of shape **A**.

..... cm^3
(2)

(Total 4 marks)

Velocity-Time Graphs

Things to remember:

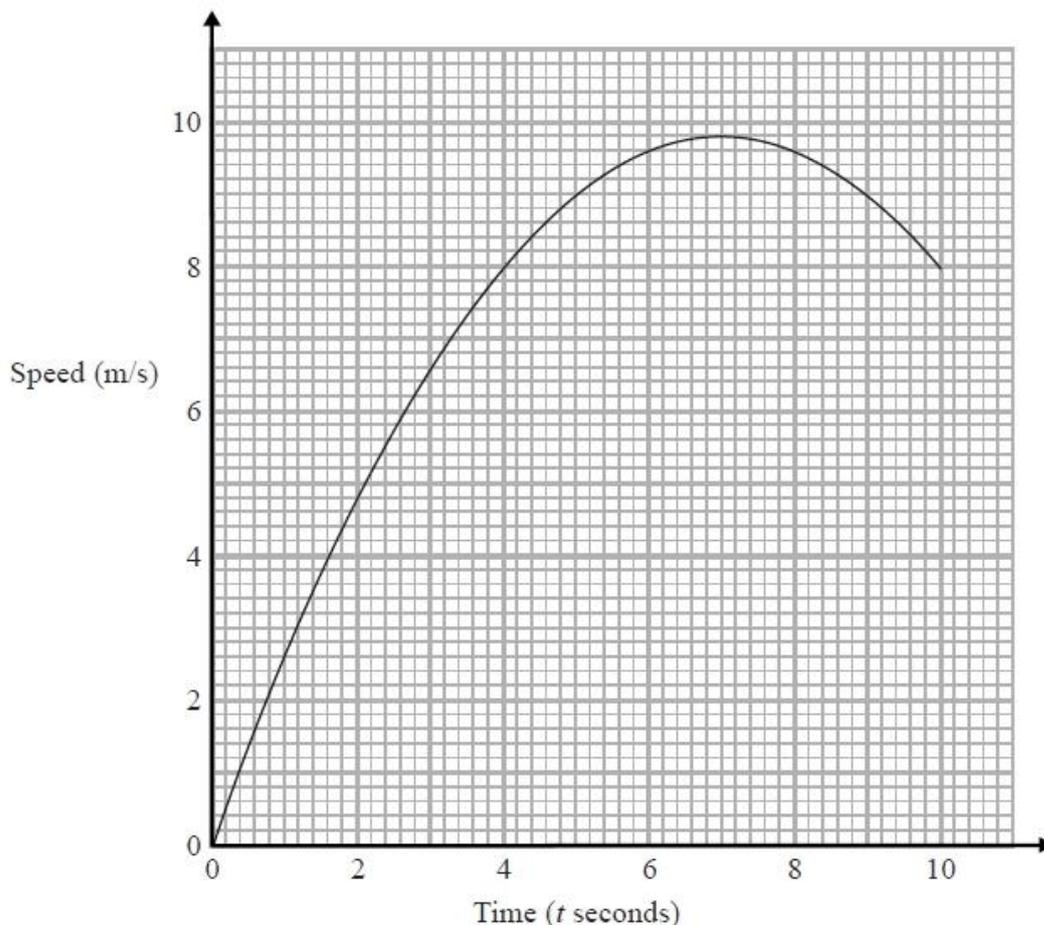
- Velocity is speed with direction
- Acceleration and deceleration is given by the gradient of the graph $\left(\frac{\text{rise}}{\text{run}}\right)$
- The distance travelled is given by the area under the graph.

Questions:

1. A car has an initial speed of u m/s.
The car accelerates to a speed of $2u$ m/s in 12 seconds.
The car then travels at a constant speed of $2u$ m/s for 10 seconds.
Assuming that the acceleration is constant, show that the total distance, in metres, travelled by the car is $38u$.

(Total for question = 4 marks)

2. Karol runs in a race.
The graph shows her speed, in metres per second, t seconds after the start of the race.



- (a) Calculate an estimate for the gradient of the graph when $t = 4$
You must show how you get your answer.

..... (3)

- (b) Describe fully what your answer to part (a) represents.

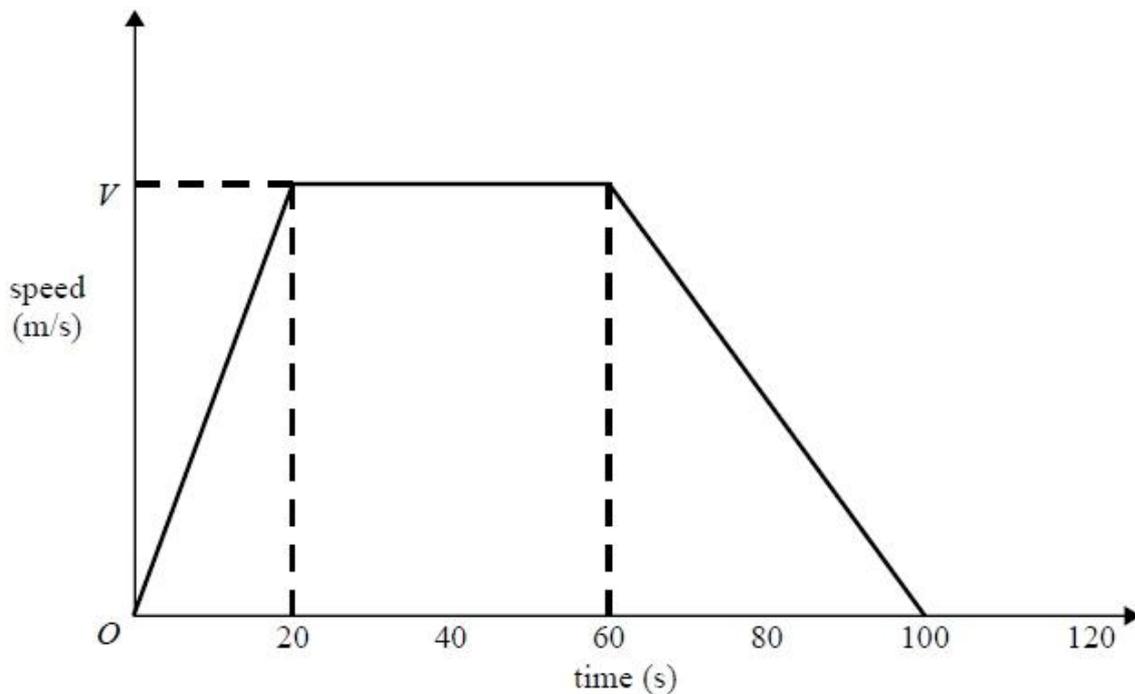
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- (c) Explain why your answer to part (a) is only an estimate.

.....
.....

(1)
(Total for question = 6 marks)

3. Here is a speed-time graph for a car journey.
The journey took 100 seconds.



The car travelled 1.75km in the 100 seconds.

- (a) Work out the value of V .

.....
(3)

- (b) Describe the acceleration of the car for each part of this journey.

.....
.....
.....
.....
.....
.....
.....
.....

(2)
(Total for question = 5 marks)