

- 1 Festival A will be in a rectangular field with an area of $80\,000\text{ m}^2$
The greatest number of people allowed to attend Festival A is 425

Festival B will be in a rectangular field 700 m by 2000 m.
The greatest number of people allowed to attend Festival B is 6750

The area per person allowed for Festival B is greater than the area per person allowed for Festival A.

- (a) How much greater?
Give your answer correct to the nearest whole number.

..... m^2
(4)

Callum says,

“ 300 cm^2 is the same as 3 m^2 because there are 100 cm in 1 m so you divide by 100”

Callum’s method is wrong.

- (b) Explain why.

.....
.....
.....
(1)

(Total for Question 1 is 5 marks)

2 A box in the shape of a cuboid is placed on a horizontal floor.

The box exerts a force of 180 newtons on the floor.

The box exerts a pressure of 187.5 newtons/m² on the floor.

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

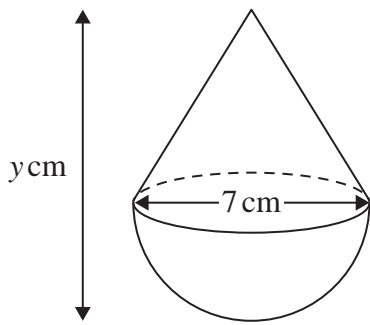
The face in contact with the floor is a rectangle of length 1.2 metres and width x metres.

Work out the value of x .

$x = \dots\dots\dots$

(Total for Question 2 is 3 marks)

3 A solid cone is joined to a solid hemisphere to make the solid **T** shown below.



Volume of sphere = $\frac{4}{3}\pi r^3$	
Volume of cone = $\frac{1}{3}\pi r^2 h$	

The diameter of the base of the cone is 7 cm.
 The diameter of the hemisphere is 7 cm.

The total volume of **T** is $120\pi \text{ cm}^3$
 The total height of **T** is $y \text{ cm}$.

- (a) Calculate the value of y .
 Give your answer correct to 3 significant figures.

$y = \dots\dots\dots$
 (4)

The diameter of the base of the cone and the diameter of the hemisphere are both increased by the same amount.
 Assuming the total volume of **T** does not change,

- (b) explain the effect this would have on your answer to part (a).

.....

.....

.....

(1)

(Total for Question 3 is 5 marks)

4 A car factory is going to make four different car models **A**, **B**, **C** and **D**.

80 people are asked which of the four models they would be most likely to buy.

The table shows information about the results.

Car model	Number of people
A	23
B	15
C	30
D	12

The factory is going to make 40 000 cars next year.

Work out how many model **B** cars the factory should make next year.

.....

(Total for Question 4 is 2 marks)

5



$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

A storage tank exerts a force of 10 000 newtons on the ground.

The base of the tank in contact with the ground is a 4 m by 2 m rectangle.

Work out the pressure on the ground due to the tank.

..... newtons/m²

(Total for Question 5 is 2 marks)

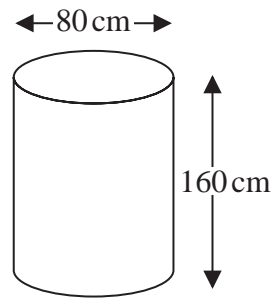
- 6 A race is measured to have a distance of 10.6 km, correct to the nearest 0.1 km.
Sam runs the race in a time of 31 minutes 48 seconds, correct to the nearest second.

Sam's average speed in this race is V km/hour.

By considering bounds, calculate the value of V to a suitable degree of accuracy.
You must show all your working and give a reason for your answer.

(Total for Question 6 is 5 marks)

- 7 Karina has 4 tanks on her tractor.
Each tank is a cylinder with diameter 80 cm and height 160 cm.



The 4 tanks are to be filled completely with a mixture of fertiliser and water.

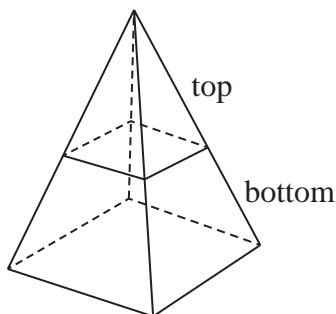
The fertiliser has to be mixed with water in the ratio 1 : 100 by volume.
Karina has 32 litres of fertiliser.

$$1 \text{ litre} = 1000 \text{ cm}^3$$

Has Karina enough fertiliser for the 4 tanks?
You must show how you get your answer.

(Total for Question 7 is 4 marks)

8 The pyramid **P** is formed from two parts made of different materials.



The top part of **P** has a mass of 92.8 g and is made from material with a density of 2.9 g/cm^3

The bottom part of **P** has a mass of 972.8 g

The average density of **P** is 4.7 g/cm^3

Calculate the volume of the top part of **P** as a percentage of the total volume of **P**.

Give your answer correct to 1 decimal place.

You must show all your working.

.....%

(Total for Question 8 is 5 marks)