1 $d = \dfrac{1}{8}c^3$

$c = 10.9$ correct to 3 significant figures.

By considering bounds, work out the value of d to a suitable degree of accuracy.
Give a reason for your answer.

(Total for Question 1 is 4 marks)

1 $d = \dfrac{1}{8}c^3$

$c = 10.9$ correct to 3 significant figures.

2 $p = \sqrt{\dfrac{2e}{f}}$

$e = 6.8$ correct to 1 decimal place.

$f = 0.05$ correct to 1 significant figure.

Work out the upper bound for the value of p.
Give your answer correct to 3 significant figures.
You must show all your working.

....

(Total for Question 2 is 3 marks)

3 The petrol consumption of a car, in litres per 100 kilometres, is given by the formula

$$\text{Petrol consumption} = \frac{100 \times \text{Number of litres of petrol used}}{\text{Number of kilometres travelled}}$$

Nathan's car travelled 148 kilometres, correct to 3 significant figures.
The car used 11.8 litres of petrol, correct to 3 significant figures.

Nathan says,

"My car used less than 8 litres of petrol per 100 kilometres."

Could Nathan be wrong?
You must show how you get your answer.

(Total for Question 3 is 3 marks)

4 Jackson is trying to find the density, in g/cm³, of a block of wood.
The block of wood is in the shape of a cuboid.

He measures

the length as 13.2 cm, correct to the nearest mm
the width as 16.0 cm, correct to the nearest mm
the height as 21.7 cm, correct to the nearest mm

He measures the mass as 1970 g, correct to the nearest 5 g.

By considering bounds, work out the density of the wood.
Give your answer to a suitable degree of accuracy.

You must show all your working and give a reason for your final answer.

(Total for Question 4 is 5 marks)

5 $D = \dfrac{u^2}{2a}$

$u = 26.2$ correct to 3 significant figures

$a = 4.3$ correct to 2 significant figures

(a) Calculate the upper bound for the value of D.
Give your answer correct to 6 significant figures.
You must show all your working.

....

(3)

The lower bound for the value of D is 78.6003 correct to 6 significant figures.

(b) By considering bounds, write down the value of D to a suitable degree of accuracy.
You must give a reason for your answer.

....

....

(2)

(Total for Question 5 is 5 marks)

6 The time period, *T* seconds, of a simple pendulum of length *l* cm is given by the formula

$$T = 2\pi\sqrt{\frac{l}{g}}$$

Katie uses a simple pendulum in an experiment to find an estimate for the value of *g*.

Here are her results.

l = 52.0 correct to 3 significant figures.
T = 1.45 correct to 3 significant figures.

Work out the upper bound and the lower bound for the value of *g*.
Use *π* = 3.142
You must show all your working.

upper bound = ...

lower bound = ...

(Total for Question 6 is 4 marks)

7   A high speed train travels a distance of 487 km in 3 hours.

The distance is measured correct to the nearest kilometre.
The time is measured correct to the nearest minute.

By considering bounds, work out the average speed, in km/minute, of the train to a
suitable degree of accuracy.
You must show all your working and give a reason for your answer.

......................................km/minute

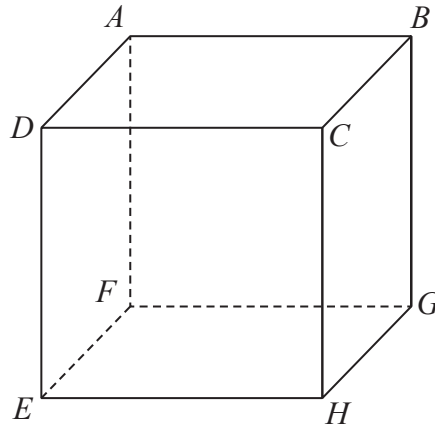**(Total for Question 7 is 5 marks)**

8 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 8 is 5 marks)

9 The diagram shows a cube.

AH = 11.3 cm correct to the nearest mm.

Calculate the lower bound for the length of an edge of the cube.
You must show all your working.

.... cm

(Total for Question 9 is 4 marks)