GCSE MATHEMATICS · HIGHER

Targeting Grade 9

Paper 6 · Calculator · 50 minutes · 40 marks

Name ..... **Date** .....

Answer **all** questions. Show all your working: answers without working may not get full marks. Diagrams are **not** accurately drawn. You may use a calculator. If your calculator does not have a π button, take the value of π to be 3.142 unless the question says otherwise.

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1 Jo bought a car for £24 000

In the first year, the value of the car decreased by 15%

In each year after the first year, the value of the car decreased by $r\%$

At the end of 3 years, the car was worth £13 056

Work out the value of r.

$r =$ .....

(Total for Question 1 is 4 marks)

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2 Metal **A** has a density of 8.4 g/cm^3

Metal **B** has a density of 2.7 g/cm^3

Metal **A** and metal **B** are mixed to make an alloy with a density of 6.3 g/cm^3

Work out the ratio volume of metal **A** : volume of metal **B**

Give your answer in its simplest form.

. . . . . .

(Total for Question 2 is 4 marks)

3 The time, T seconds, for one swing of a pendulum is given by

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

$L = 2.5$, correct to 1 decimal place.

$g = 9.81$, correct to 3 significant figures.

By considering bounds, work out the value of T to a suitable degree of accuracy.

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

seconds .....

(Total for Question 3 is 5 marks)

4 A solid sphere has a radius of 6 cm.

A solid cylinder has the same volume as the sphere.

The height of the cylinder is 3 times the radius of the cylinder.

Work out the total surface area of the cylinder.

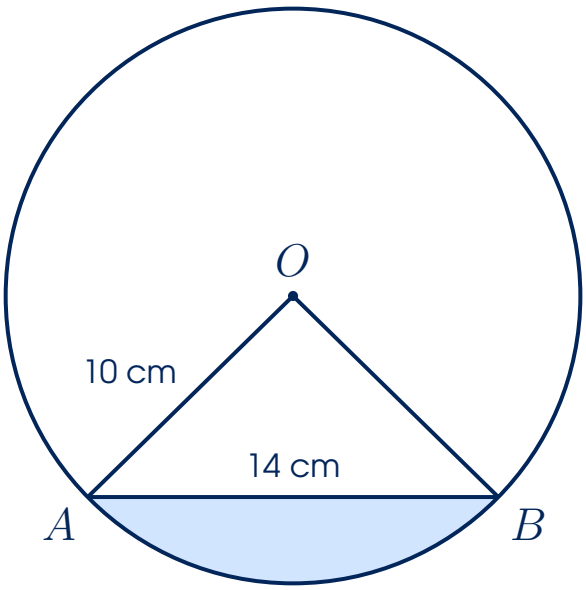
Give your answer correct to 3 significant figures.

Volume of a sphere $= \frac{4}{3}\pi r^3$

cm^2 .....

(Total for Question 4 is 5 marks)

5



A and B are points on a circle, centre O.

The radius of the circle is 10 cm.

The length of the chord AB is 14 cm.

Work out the area of the shaded segment.

Give your answer correct to 3 significant figures.

cm^2 .....

(Total for Question 5 is 5 marks)

6 A ship sails 12 km from port P to a point Q on a bearing of $070°$
It then sails 9 km from Q to a point R on a bearing of $160°$

(a) Work out the distance PR.

km .....

(2)

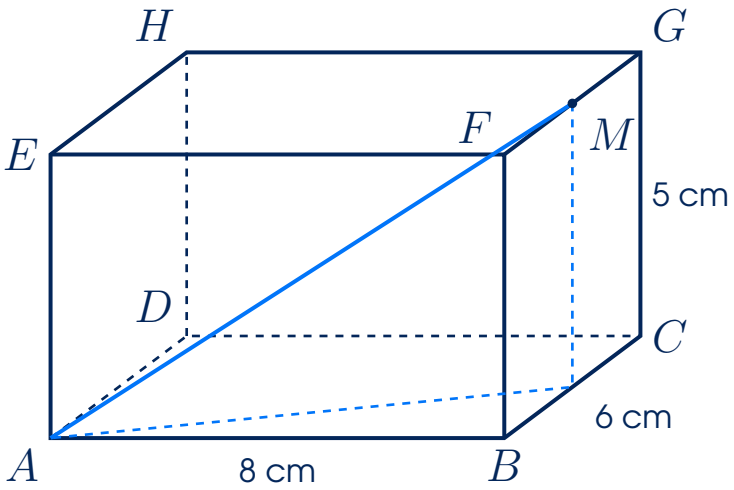
(b) Work out the bearing of P from R.
Give your answer correct to the nearest degree.

° .....

(4)

(Total for Question 6 is 6 marks)

7



$ABCDEFGH$ is a cuboid.

$AB = 8$ cm, $BC = 6$ cm, $CG = 5$ cm

M is the midpoint of FG.

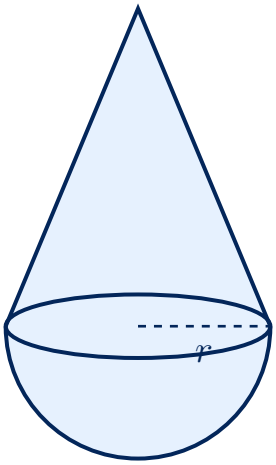
Work out the size of the angle between AM and the plane $ABCD$.

Give your answer correct to 1 decimal place.

° .....

(Total for Question 7 is 5 marks)

8



A solid is made from a cone on top of a hemisphere.

The cone and the hemisphere both have radius r cm.

The slant height of the cone is $2.6r$ cm.

The total surface area of the solid is 115π cm^2

Work out the volume of the solid.

Give your answer correct to 3 significant figures.

Curved surface area of a cone $= \pi rl$	Surface area of a sphere $= 4\pi r^2$
Volume of a cone $= \frac{1}{3}\pi r^2 h$	Volume of a sphere $= \frac{4}{3}\pi r^3$

cm^3 .....

(Total for Question 8 is 6 marks)

TOTAL FOR PAPER IS 40 MARKS