GCSE MATHEMATICS · HIGHER

Targeting Grade 9

Paper 2 · 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 The length of a rectangle is 12.4 cm, correct to 1 decimal place.

The area of the rectangle is 85 cm^2, correct to 2 significant figures.

By considering bounds, work out the width of the rectangle to a suitable degree of accuracy.

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

cm .....

(Total for Question 1 is 5 marks)

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2 The number of bacteria in a sample increases by the same percentage every hour.

At the end of 2 hours there are 5408 bacteria in the sample.

At the end of 5 hours there are 6083 bacteria in the sample, correct to the nearest whole number.

Work out the number of bacteria in the sample at the start.

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(Total for Question 2 is 4 marks)

3 Two solid metal shapes, **A** and **B**, are mathematically similar.

Both shapes are made from the same metal.

The total surface area of **A** is 150 cm^2

The total surface area of **B** is 384 cm^2

The mass of **B** is 2.56 kg more than the mass of **A**.

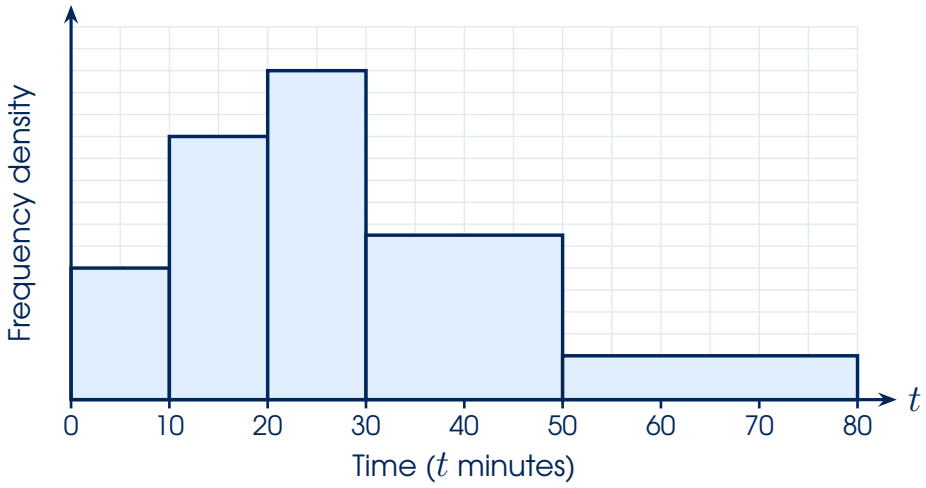
Work out the mass of **A**.

Give your answer in grams, correct to the nearest gram.

g .....

(Total for Question 3 is 4 marks)

4 The histogram shows information about the times, t minutes, that some people waited for a train.



The bar for $0 < t \leqslant 10$ represents 12 people.

(a) Work out an estimate for the number of people who waited between 25 minutes and 40 minutes.

.....

(3)

(b) Two of the people are chosen at random.

Work out the probability that both of these people waited more than 50 minutes.

.....

(3)

(Total for Question 4 is 6 marks)

5 A sequence is defined by the term-to-term rule

$$u_{n+1} = k\,u_n + 3$$

where k is a constant.

$u_1 = 2$ and $u_3 = 23$

(a) Work out the two possible values of k.

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(4)

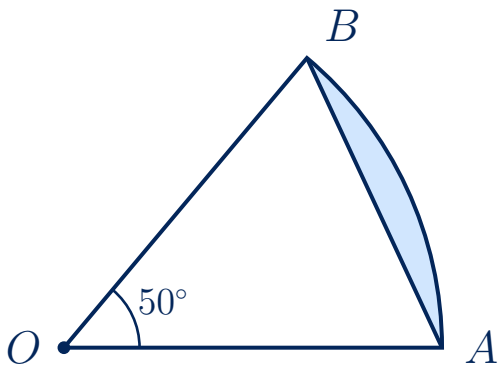
(b) For the positive value of k, find the first term of the sequence that is greater than 1000

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(2)

(Total for Question 5 is 6 marks)

6



OAB is a sector of a circle, centre O.

Angle $AOB = 50°$

The area of the shaded segment is 10 cm^2

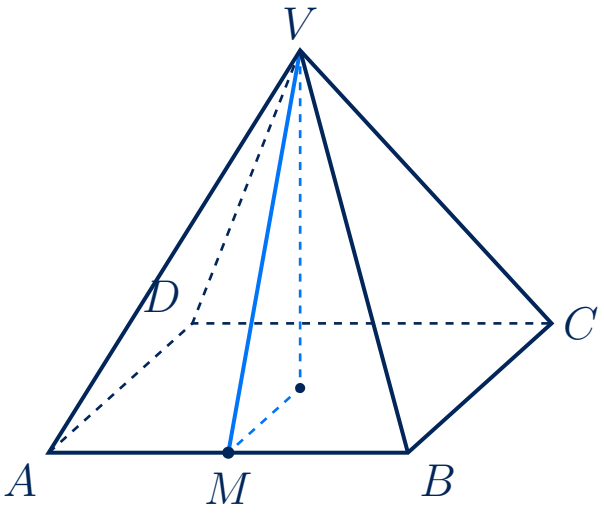
Work out the radius of the circle.

Give your answer correct to 3 significant figures.

cm .....

(Total for Question 6 is 5 marks)

7



$VABCD$ is a pyramid.

The base $ABCD$ is a square with sides of length 10 cm.

The vertex V is directly above the centre of the square.

$VA = VB = VC = VD = 13$ cm.

M is the midpoint of AB.

Work out the size of the angle between VM and the base $ABCD$.

Give your answer correct to 1 decimal place.

° .....

(Total for Question 7 is 5 marks)

8 ABC is a triangle.

$AB = 9$ cm, $AC = 7$ cm and angle $ABC = 40°$

There are two possible triangles that fit this information.

Work out the two possible lengths of BC.

Give your answers correct to 3 significant figures.

You must show all your working.

cm .....

cm .....

(Total for Question 8 is 5 marks)

TOTAL FOR PAPER IS 40 MARKS

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