

GCSE Grade 8/9

Maths
Booklet 3

Paper 3H
Calculator

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- 1 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 1 is 5 marks)



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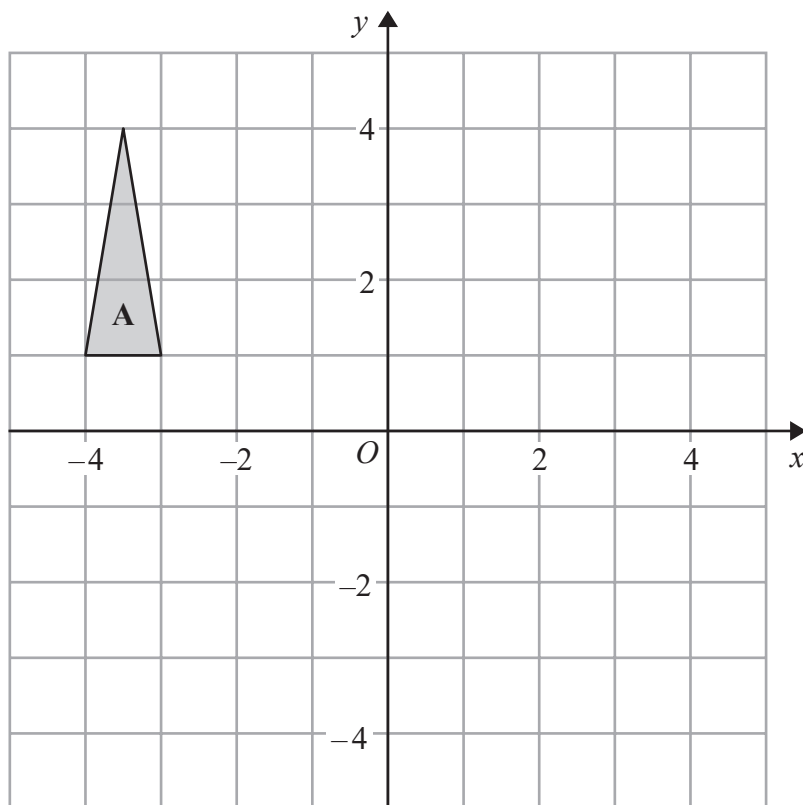
2 Solve algebraically the simultaneous equations

$$\begin{aligned}2x^2 - y^2 &= 17 \\ x + 2y &= 1\end{aligned}$$

(Total for Question 2 is 5 marks)



P 5 5 5 9 8 A 0 1 9 2 0



Triangle **A** is transformed by the combined transformation of a rotation of 180° about the point $(-2, 0)$ followed by a translation with vector $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$

One point on triangle **A** is invariant under the combined transformation.

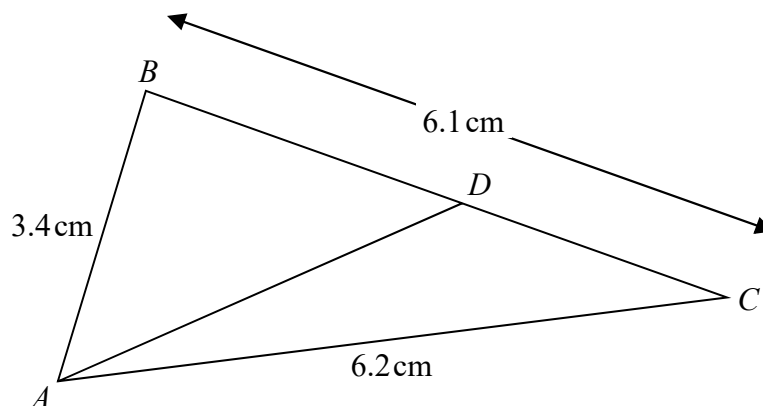
Find the coordinates of this point.

(.....,)

(Total for Question 3 is 2 marks)



- 4 The diagram shows triangle ABC .



$$AB = 3.4 \text{ cm} \quad AC = 6.2 \text{ cm} \quad BC = 6.1 \text{ cm}$$

D is the point on BC such that

$$\text{size of angle } DAC = \frac{2}{5} \times \text{size of angle } BCA$$

Calculate the length DC .

Give your answer correct to 3 significant figures.

You must show all your working.

..... cm

(Total for Question 4 is 5 marks)

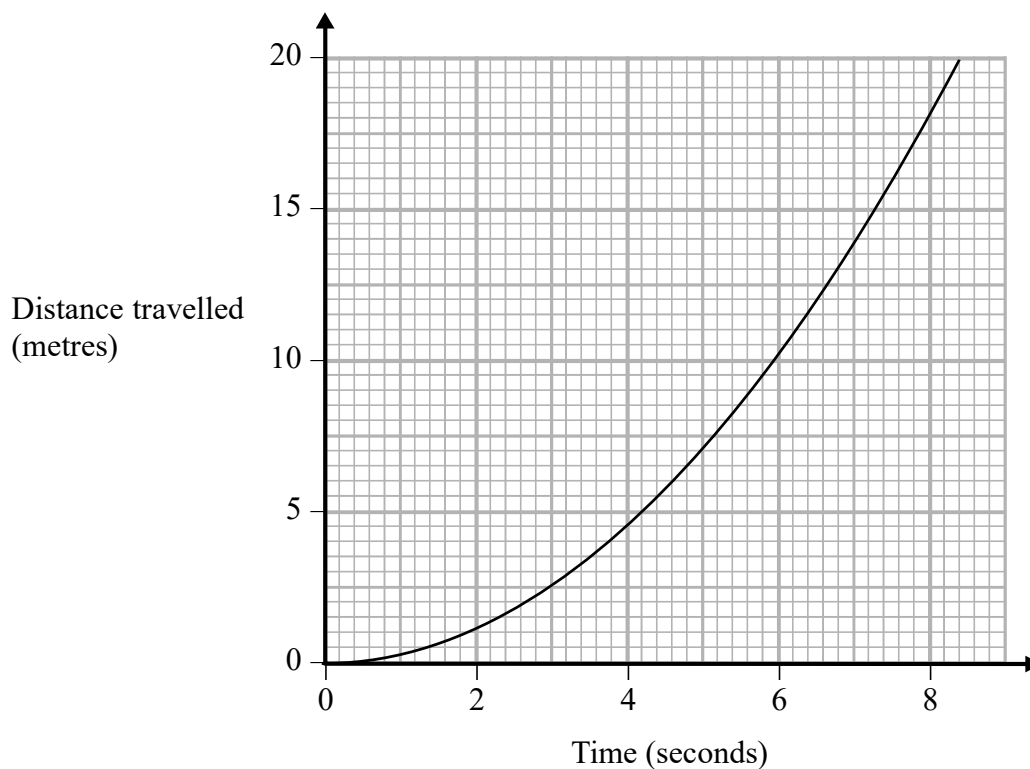


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5 The graph shows information about part of a cyclist's journey.



Work out an estimate of the speed, in m/s, of the cyclist at time 6 seconds.

..... m/s

(Total for Question 5 is 3 marks)



6 Here are the first five terms of a sequence.

−1 0 3 8 15

Find an expression, in terms of n , for the n th term of this sequence.

(Total for Question 6 is 2 marks)

7 When a biased coin is thrown 4 times, the probability of getting 4 heads is $\frac{16}{81}$

Work out the probability of getting 4 tails when the coin is thrown 4 times.

(Total for Question 7 is 2 marks)



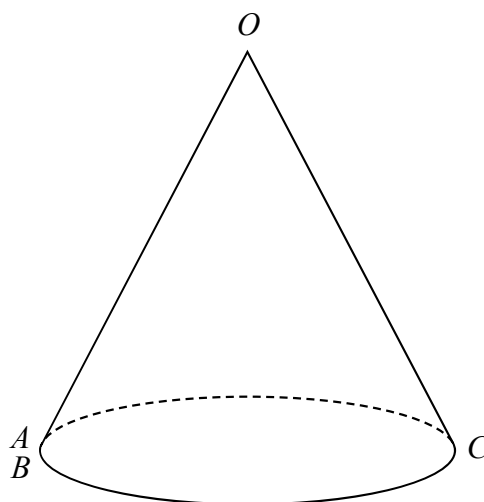
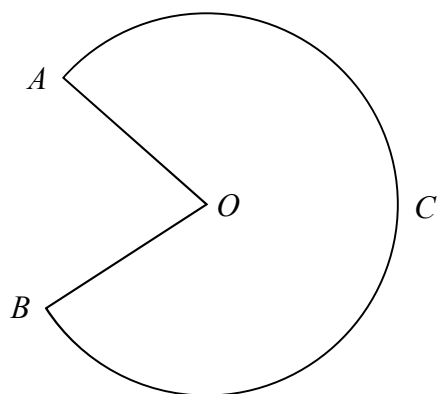
- 8 Show that $\frac{7x-14}{x^2+4x-12} \div \frac{x-6}{x^3-36x}$ simplifies to ax where a is an integer.

(Total for Question 8 is 4 marks)



- 9 The diagram shows a sector $OACB$ of a circle with centre O .
The point C is the midpoint of the arc AB .

The diagram also shows a hollow cone with vertex O .
The cone is formed by joining OA and OB .



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

$$\text{Curved surface area of cone} = \pi r l$$

The cone has volume 56.8 cm^3 and height 3.6 cm .

Calculate the size of angle AOB of sector $OACB$.
Give your answer correct to 3 significant figures.
You must show all your working.

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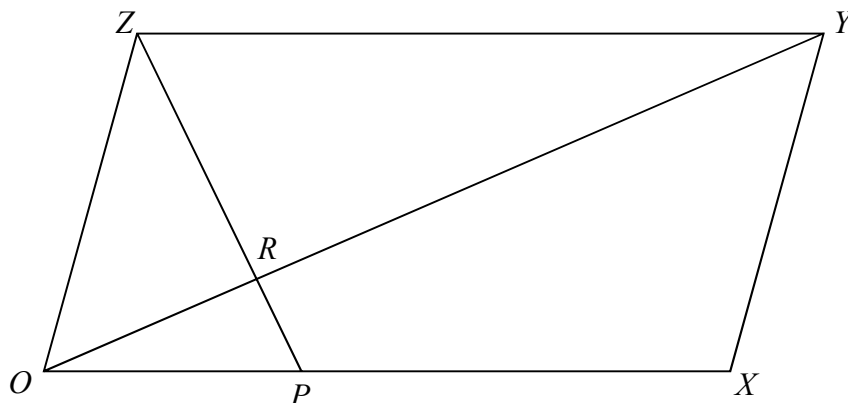
o

(Total for Question 9 is 5 marks)



P 5 8 8 7 6 R A 0 2 1 2 4

10 $OXYZ$ is a parallelogram.



$$\vec{OX} = \mathbf{a}$$

$$\vec{OY} = \mathbf{b}$$

P is the point on OX such that $OP:PX = 1:2$

R is the point on OY such that $OR:RY = 1:3$

Work out, in its simplest form, the ratio $ZP:ZR$

You must show all your working.

(Total for Question 10 is 5 marks)

