

Surname	
Other Names	
Candidate Signature	

Centre Number						Candidate Number				
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Examiner Comments	

Total Marks

PAPER 2H

GCSE MATHEMATICS

CM

Practice Set A

Calculator

Time allowed: 1 hour 30 minutes

Instructions to candidates:

- In the boxes above, write your centre number, candidate number, your surname, other names and signature.
- Answer ALL of the questions.
- You must write your answer for each question in the spaces provided.
- You may use a calculator.

Information to candidates:

- Full marks may only be obtained for answers to ALL of the questions.
- The marks for individual questions and parts of the questions are shown in round brackets.
- There are 18 questions in this question paper. The total mark for this paper is 80.

Advice to candidates:

- You should ensure your answers to parts of the question are clearly labelled.
- You should show sufficient working to make your workings clear to the Examiner.
- Answers without working may not gain full credit.

GCSE/A2H

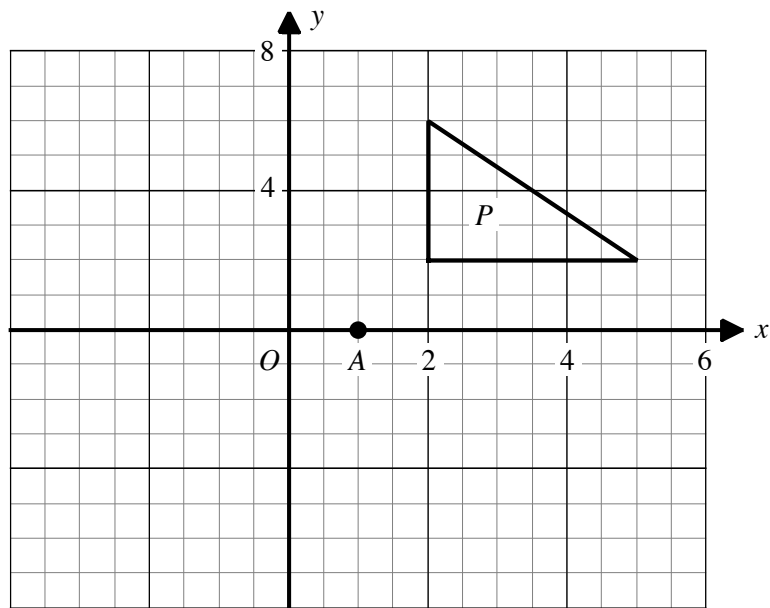
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1 0 3 3 1 1 2 1 8 0 0 0 4



1 The shape P is shown on the coordinate axes below.



(a) Write down the coordinates of the point A .

.....

(1)

(b) On the axes above, rotate the shape P by 180 degrees about the point A .

Label your rotated shape P^* .

(3)

(Total for Question 1 is 4 marks)

2 Factorise fully $2m^2 + 8m + 6$.

.....

(Total for Question 2 is 2 marks)



3 Alice and her friends ordered a take-away meal.

Part of their bill is shown below.

Tasty Meals	
chicken	£5.60
rice	£3.40
fries	£2.35
sweetcorn	£1.20
ice cream	£2.10
drinks	?
<hr/>	
subtotal	?
VAT	20% of subtotal
<hr/>	
total	£22.50

Find the total cost of the drinks ordered by Alice and her friends.

£.....

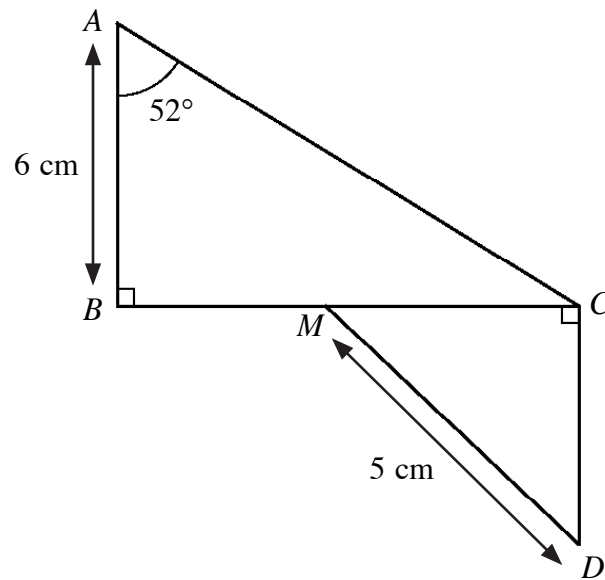
(Total for Question 3 is 3 marks)



1 0 3 3 1 1 2 1 8 0 0 0 4



4 Two right-angled triangles, ABC and MCD , are shown in the diagram below.



**NOT
TO SCALE**

The point M is the midpoint of BC .

Find the length of the side CD .

.....
(Total for Question 4 is 4 marks)



- 5** Across 25 football matches, a football team has a mean score of 2.80 goals per match. The team have one more match left in the tournament. They want to raise their mean number of goals per match to 3.00 for this tournament. How many goals does the football team need to score in their final match to achieve this?

.....
(Total for Question 5 is 3 marks)

-
- 6** In the space below, construct an equilateral triangle of side length 3 cm. You must show all of your construction lines.

(Total for Question 6 is 2 marks)



1 0 3 3 1 1 2 1 8 0 0 0 4



7 A unfair die has four sides, labelled 1 to 4.

When the die is thrown,

the probability of it landing on a 4 is twice the probability of it landing on a 1
the probability of it landing on a 1, 2 or 3 is the same.

In a round, Amir rolls this die twice and adds together the scores on the die.

Amir plays a hundred rounds.

Calculate the expected number of rounds where his sum is 8.

.....

(Total for Question 7 is 4 marks)

8 $\mathbf{a} = \begin{pmatrix} -3 \\ 2 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} 1 \\ 5 \end{pmatrix}$

(a) Describe the geometrical relationship between the vector \mathbf{b} and the vector $-\mathbf{b}$.

.....

(2)

(b) Find $\mathbf{a} - 3\mathbf{b}$.

.....

(2)

(Total for Question 8 is 4 marks)



9 Two measurements, x and y , are made, where

$x = 2.1$ rounded to 1 decimal place

and $y = 4.6$ truncated to 1 decimal place

(a) (i) Write down the error interval for x .

.....
(1)

(ii) Write down the error interval for y .

.....
(1)

(iii) Write down the error interval for $x - y$.

.....
(1)

(b) The quantity S is given by

$$S = \frac{3x - 2}{y}$$

Find the upper and lower bounds of S .

.....
(4)

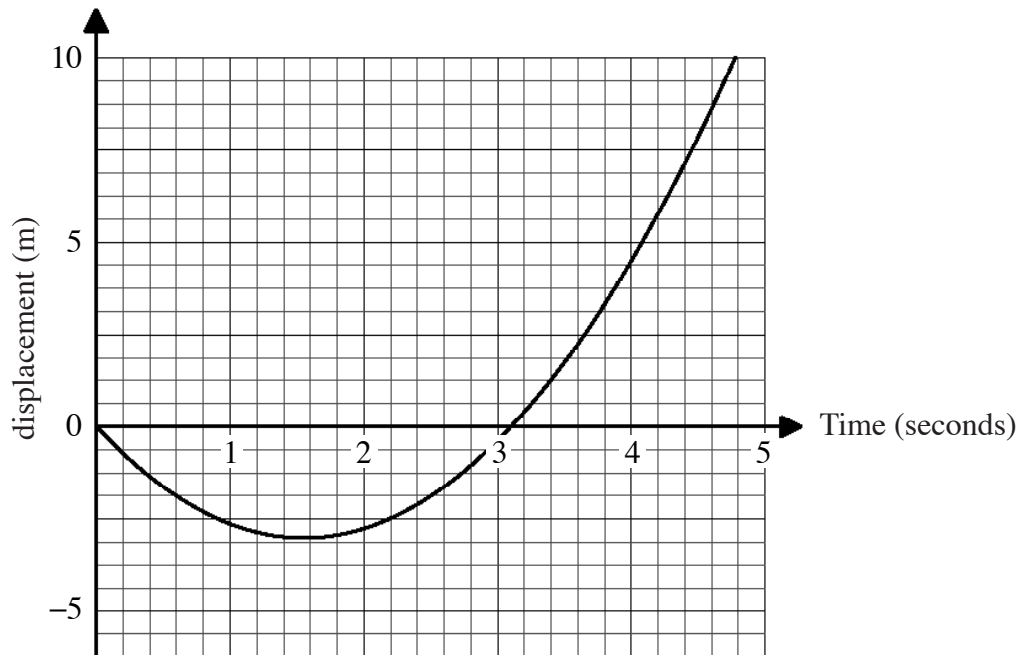
(Total for Question 9 is 7 marks)



1 0 3 3 1 1 2 1 8 0 0 0 4



10 The diagram below shows the displacement-time graph for the motion of a car.



- (a) Find an estimate for the velocity of the car after 4 seconds.
Give a suitable unit with your answer.

.....

(4)

- (b) Is your answer to part (a) an over-estimate or an under-estimate?
Circle the correct option and explain your reasoning.

over-estimate under-estimate

explanation

.....

.....

(2)

(Total for Question 10 is 6 marks)



1 0 3 3 1 1 2 1 8 0 0 0 4

11 Show that the equation $x^3 + 2x^2 + 3x - 4 = 0$ has a solution between $x = 0$ and $x = 1$.

(Total for Question 11 is 3 marks)

12 Solve the equation $4x^2 - 5x = 1$.

Give your answers to two decimal places.

.....
(Total for Question 12 is 3 marks)



1 0 3 3 1 1 2 1 8 0 0 0 4



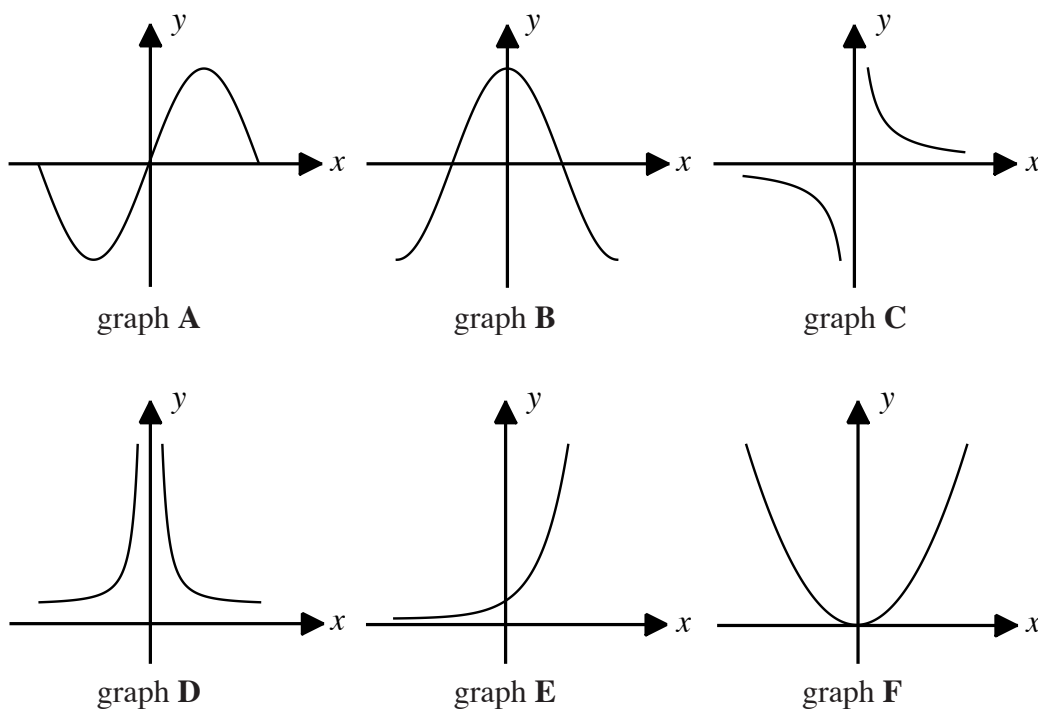
- 13** Two rectangular cuboids **A** and **B** are mathematically similar.
The cross-sectional areas of **A** and **B** are in the ratio 1:2.
The volume of **A** is 1000 cm^3 .
Find the volume of **B**.

..... cm^3

(Total for Question 13 is 4 marks)



14 Sketches of the graphs A, B, C, D, E and F are shown below.



Complete the table below by matching each function with its corresponding graph.

The first row has been completed for you.

Function	Corresponding graph
$y = x^2$	graph F
$y = 2^x$	
$y = \sin x$	
$y = x^{-1}$	
$y = \cos x$	
$y = \frac{1}{x^2}$	

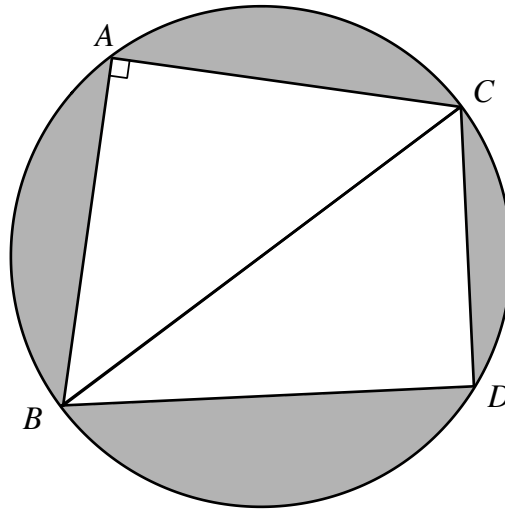
(Total for Question 14 is 5 marks)



1 0 3 3 1 1 2 1 8 0 0 0 4



15 The triangles ABC and BCD are inscribed within the circle P , as shown in the diagram below.



**NOT
TO SCALE**

(a) Select the **best** term that can describe the line BC .

- segment radius diameter chord

(1)

(b) Given that

$BC = 10$ cm

the angle $ABC = 35^\circ$

the angle $BCD = 63^\circ$,

find the area of the shaded region.

.....cm²

(4)

(Total for Question 15 is 5 marks)



16 When a particle travels at high speeds, its mass changes according to the formula

$$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

where m is the mass of the particle, in kg, when it is moving with velocity v m/s

m_0 is the mass of the particle, in kg, when it is at rest

c is a constant.

(a) Make c the subject of the formula.

.....
(4)

A particle P has rest mass 1.67×10^{-27} kg.

When it travels at 2.85×10^8 m/s, its mass is 5.35×10^{-27} kg.

(b) Find the mass of P when it travels at 2.31×10^8 m/s.

.....kg
(4)

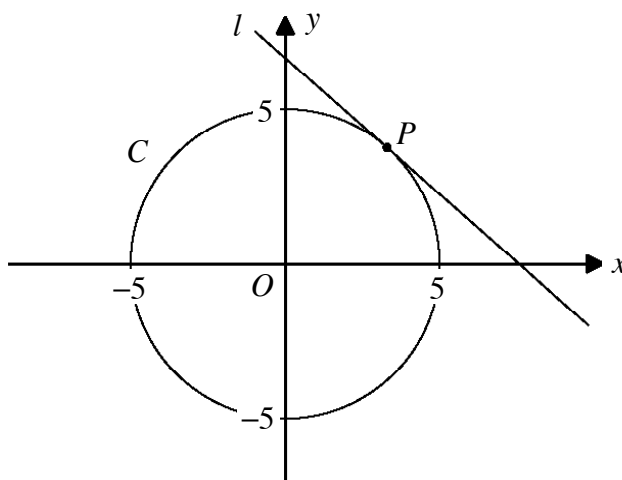
(Total for Question 16 is 8 marks)



1 0 3 3 1 1 2 1 8 0 0 0 4



17 The diagram below shows a sketch of the circle C with centre O .



The circle has the equation $x^2 + y^2 = k$, where k is a constant.

(a) Write down the value of k .

.....

(1)

The line l is a tangent to the circle at the point P .

The x coordinate of the point P is 3.

(b) By considering the gradient of the line segment OP , find the gradient of l .

.....

(4)

Question continues on the next page



(c) Find the equation of the line l .

Give your answer in the form $y = mx + c$.

.....
(3)

(Total for Question 17 is 8 marks)

18 Show in clear stages that

$$\sqrt{125} - 2\sqrt{5} + \frac{5(1-\sqrt{5})}{\sqrt{5}} \equiv a + b\sqrt{5}$$

where a and b are integers to be found.

(Total for Question 18 is 5 marks)

TOTAL FOR PAPER = 80 MARKS



1 0 3 3 1 1 2 1 8 0 0 0 4



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