

Write your name here

Surname	Other names
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Centre Number Candidate Number

Pearson Edexcel Level 1/Level 2 GCSE (9 - 1)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> </table> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> <td style="border: 1px solid black; width: 20px; height: 20px;"></td> </tr> </table>									

<h1 style="margin: 0;">Mathematics A03</h1> <h2 style="margin: 0;">Mathematical problem solving</h2>	 Grades 5-6
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Time: 45-60 minutes	Paper Reference 1MA1
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You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.	Total Marks <div style="border: 1px solid black; width: 100%; height: 40px;"></div>
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Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- **Calculators must not be used in questions marked with an asterisk (*).**
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out** with your **answer clearly identified** at the **end of your solution**.



Information

- This gold test is aimed at students targeting grades 5-6.
- This test has 7 questions. The total mark for this paper is 34.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

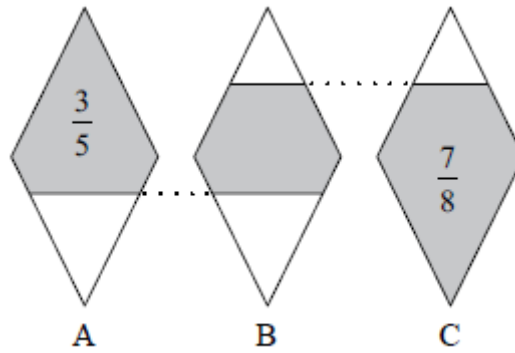
Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

*1. The diagram shows three identical shapes A, B and C.

$\frac{3}{5}$ of shape A is shaded.

$\frac{7}{8}$ of shape C is shaded.



What fraction of shape B is shaded?

(Total for Question 1 is 3 marks)

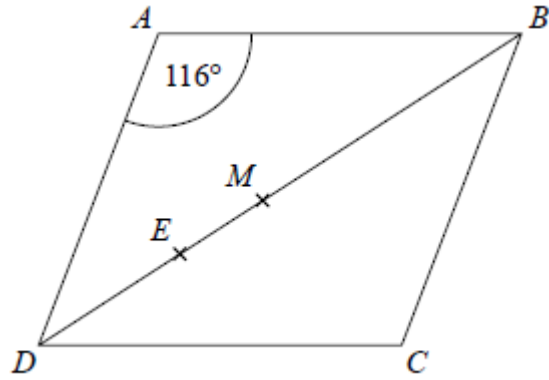
*2. On a farm, $4\frac{1}{2}$ out of every 15 acres of the land are used to grow crops.

Wheat is grown on $\frac{5}{8}$ of the land used to grow crops.

What percentage of the total area of the land on the farm is used to grow wheat?

(Total for Question 2 is 3 marks)

3.



$ABCD$ is a rhombus.

M is the midpoint of BD .

E is the point on BD such that $DE = CE$.

Calculate the size of angle MCE .

(Total for Question 3 is 3 marks)

4. A school has a biathlon competition.
Each athlete has to throw a javelin and run 200 metres.

(a) The points scored for throwing a javelin are worked out using the formula

$$P_1 = 16(D - 3.8)$$

where P_1 is the number of points scored when the javelin is thrown a distance D metres.

- (i) Lottie throws the javelin a distance of 42 metres.
How many points does Lottie score?

- (ii) Ingrid scores 584 points for throwing the javelin.
Work out the distance that the javelin was thrown by Ingrid.

(4)

The points scored for running 200 metres are worked out using the formula

$$P_2 = 5(42.5 - T)^2$$

where P_2 is the number of points scored when the time taken to run 200 metres is T seconds.

Suha scores 1280 points in the 200 metres.

- (b) (i) Work out the time, in seconds, it took Suha to run 200 metres.

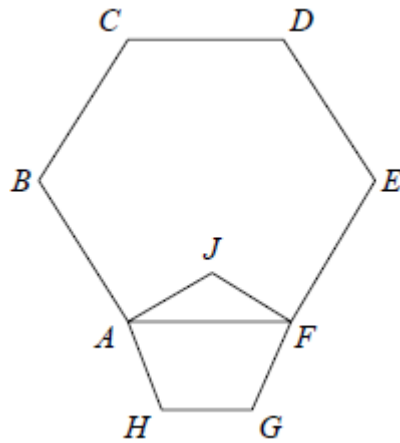
The formula for the number of points scored in the 200 metres should not be used for $T > n$.

- (ii) State the value of n .
Give a reason for your answer.

(4)

(Total for Question 4 is 8 marks)

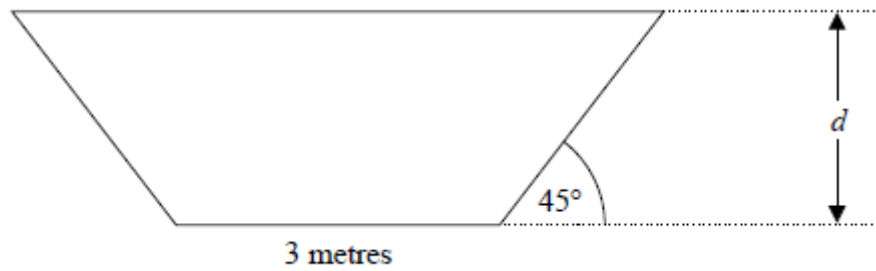
- *5. $ABCDEF$ is a regular hexagon.
 $AJFGH$ is a regular pentagon.



Work out the size of angle BAJ .

(Total for Question 5 is 4 marks)

6. The diagram shows the cross-section of the water in a drainage channel.



The cross-section is in the shape of a trapezium with one line of symmetry.

The base of the drainage channel is horizontal.

The two equal sides of the trapezium are each inclined at 45° to the horizontal.

The length of the base of the trapezium is 3 metres.

The depth of the water is d metres.

The area of the cross-section is $A \text{ m}^2$.

- (a) Write a formula for A in terms of d .
Give your answer in its simplest form.

(3)

The depth of the water in the drainage channel is 1.5 metres.

- (b) Find the area of the cross-section of the water.

(2)

The water flows along the drainage channel at a rate of 486 000 litres per minute.
The depth of the water is constant.

- (c) Work out the speed of the water.
Give your answer in metres per second.

(4)

(Total for Question 6 is 9 marks)

***7.** Ishmael is a salesperson for a company.

His monthly wage is made up of his fixed basic wage plus commission.
His commission for a month is a fixed percentage of the sales he makes that month.

The table gives some information about his monthly wages.

Month	Monthly wage	Sales (£)
June	1700	20 000
July	2200	30 000
August	2050	27 000

In September, Ishmael's monthly wage was £1850.

Work out his sales, in £, for September.

(Total for Question 7 is 4 marks)

TOTAL FOR PAPER IS 34 MARKS

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Question	Working	Answer	Mark	AO	Notes
*1	Shaded area in B $= 1 - \frac{2}{5} - \frac{1}{8}$ or $\frac{3}{5} - \frac{1}{8}$	$\frac{19}{40}$	P P A	3.1b 3.1b 1.3b	P1 for strategy to start to solve problem, e.g. $1 - \frac{3}{5}$ or $1 - \frac{7}{8}$ or correct equation, e.g. $x + \frac{1}{8} = \frac{3}{5}$ P1 for setting up a calculation that will lead to the correct answer, e.g. $1 - \frac{2}{5} - \frac{1}{8}$ or $\frac{3}{5} - \frac{1}{8}$ or $\frac{7}{8} - \frac{2}{5}$ A1 cao
*2	$\frac{4.5}{15} \times \frac{5}{8} = \frac{22.5}{120}$ $\frac{22.5}{120} \times 100$	18.75 (%)	P P A	3.1d 3.1d 1.3b	P1 for process to find amount of amount of land for wheat, e.g. $\frac{4.5}{15} \times \frac{5}{8}$ P1 for complete process, e.g. $\frac{22.5}{120} \times 100$ A1 18.75 oe
3		26°	P P A	3.1b 3.1b 1.3b	P1 for a correct process that leads to angle EDC, e.g. $(180^\circ - 116^\circ) \div 2$ P1 for a correct process that leads to angle MCE, e.g. $(58^\circ - 32^\circ)$ A1 cao

Question	Working	Answer	Mark	AO	Notes
4 (a) (i)		611.2	M	1.3a	M1 for $16 \times (42 - 3.8)$
			A	1.3a	A1 for 611 (accept 611.2)
(ii)		40.3 m	M	1.3b	M1 for a fully correct method to find distance by applying the correct inverse operations in the correct order
			A	1.3b	A1 for 40.3 m
*5		84°	P	3.1b	P1 for process to find size of interior angle of hexagon or pentagon
			P	3.1b	P1 for establishing a correct process to find angle JAF , e.g. $JAF = (180 - 108) \div 2$
			P	3.1b	P1 for a complete process to find angle BAJ
			A	1.3b	A1 cao
6 (a)	Width of surface = $d + d + 3$ Area of cross-section = $\frac{d}{2}(d + d + 3 + 3)$	$A = d(d + 3)$	P	3.1b	P1 for correct process to find width of surface
			P	3.1b	P1 for correct process to find cross-sectional area, e.g. $\frac{d}{2}(d + d + 3 + 3)$
			A	1.3b	A1 for $A = d(d + 3)$ or $A = d^2 + 3d$

Question	Working	Answer	Mark	AO	Notes
6 (b)	$A = 1.5(1.5 + 3)$	6.75 m^2	M A	1.3a 1.3a	M1 for substitution of 1.5 in formula or a complete method starting again A1 for 6.75
(c)	$486000 \div 60 = 8100$ $8100 \text{ L} = 8.1 \text{ m}^3$ $8.1 \div 6.75$	1.2 m/s	P P P A	3.1d 3.1d 3.1d 1.3b	P1 for a correct process to convert rate to per second, e.g. $486\ 000 \div 60 (= 8100)$ P1 for process to convert to m ³ , e.g. " 8100 " \div 1000 P1 for process to convert litres/min to m/s, e.g. " 8.1 " \div ".75" A1 cao
7	Method 1 $2200 - 1700 = 500$ $30000 - 0000 = 10000$ For every £100 increase in wage the increase in sales = £2000 $1850 - 1700 = 150$ Difference in sales $= 1.5 \times 2000 = 3000$ $20000 + 3000$	23000	P P P A	2.3a 3.1d 3.1d 1.3b	P1 for process to interpret information, e.g. $2200 - 1700 = 500$ oe or use $y = mx + c$ or start to draw graph P1 for process to build on initial strategy, e.g. $2200 - 1700 = 500$ and $30000 - 20000 = 10000$ oe use proportional increase or process to find m and c P1 for strategy to use found information, e.g. $1000 \div 5$ or use values of m and c or use straight line graph A1 cao

Question	Working	Answer	Mark	AO	Notes
	<p>Method 2</p> <p>Use $y = mx + c$</p> $1700 = 20000m + c$ $2200 = 30000m + c$ $m = \frac{2200 - 1700}{30000 - 20000} = 0.05$ $c = 2200 - 30000 \times 0.05 = 700$ <p>When $y = 1850$, $x = \frac{1850 - 700}{0.05}$</p> <p>Method 3</p> <p>Draw a graph</p>				