

EDEXCEL • GCSE MATHEMATICS 1MA1

Higher Tier — Paper 1

Non-Calculator

November 2024 exam series

QUESTION PAPER

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Please check the examination details below before entering your candidate information

Candidate surname		Other names	
Centre Number		Candidate Number	

Pearson Edexcel Level 1/Level 2 GCSE (9–1)

Wednesday 6 November 2024

Morning (Time: 1 hour 30 minutes)	Paper reference	1MA1/1H
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Mathematics

PAPER 1 (Non-Calculator)

Higher Tier



You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB or B pencil, eraser, Formulae Sheet (enclosed). Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **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.*
- You must **show all your working**.
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- **Calculators may not be used.**

Information

- The total mark for this paper is 80
- 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.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Work out $818.4 \div 1.2$

(Total for Question 1 is 3 marks)

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- 2 The table shows the probabilities that a biased dice will land on 3, on 4, on 5 and on 6

Number on dice	1	2	3	4	5	6
Probability			0.10	0.30	0.05	0.25

Karim assumes that the probabilities that the dice will land on 1 and on 2 are the same.

Karim rolls the biased dice 500 times.

- (a) Assuming Karim is right, work out an estimate for the number of times the dice will land on 2

.....
(3)

Karim is wrong.

The probability that the dice will land on 2 is greater than the probability that the dice will land on 1

- (b) How does this information affect your answer to part (a)?

.....
.....
.....
(1)

(Total for Question 2 is 4 marks)



3 (a) Work out $3\frac{1}{2} - 1\frac{1}{6}$

Give your answer as a mixed number.

(2)

(b) Show that $5\frac{1}{4} \div 2\frac{1}{3} = 2\frac{1}{4}$

(3)

(Total for Question 3 is 5 marks)

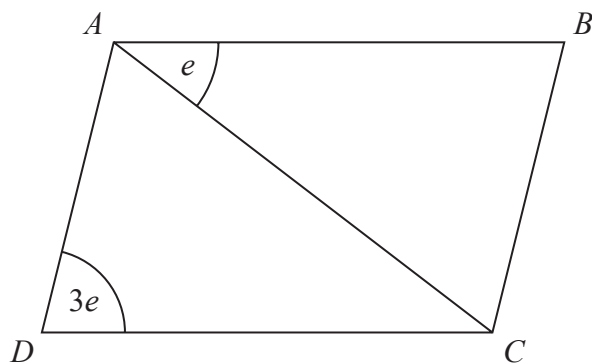


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- 4 $ABCD$ is a parallelogram.



All angles are measured in degrees.

Find an expression, in terms of e , for the size of angle CAD .
Give a reason for each stage of your working.

(Total for Question 4 is 3 marks)



5 A car travelled 4.96 miles at an average speed of 30.4 miles per hour.

- (a) Work out an estimate for the time taken by the car.
Give your answer in minutes.

..... minutes
(3)

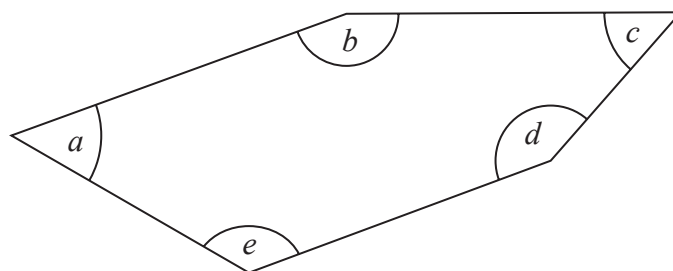
- (b) Is your answer to part (a) an underestimate or an overestimate?
Give a reason for your answer.

.....
.....
.....
(1)

(Total for Question 5 is 4 marks)



6 Here is a pentagon.



Angle a = angle c

Angle b = 155°

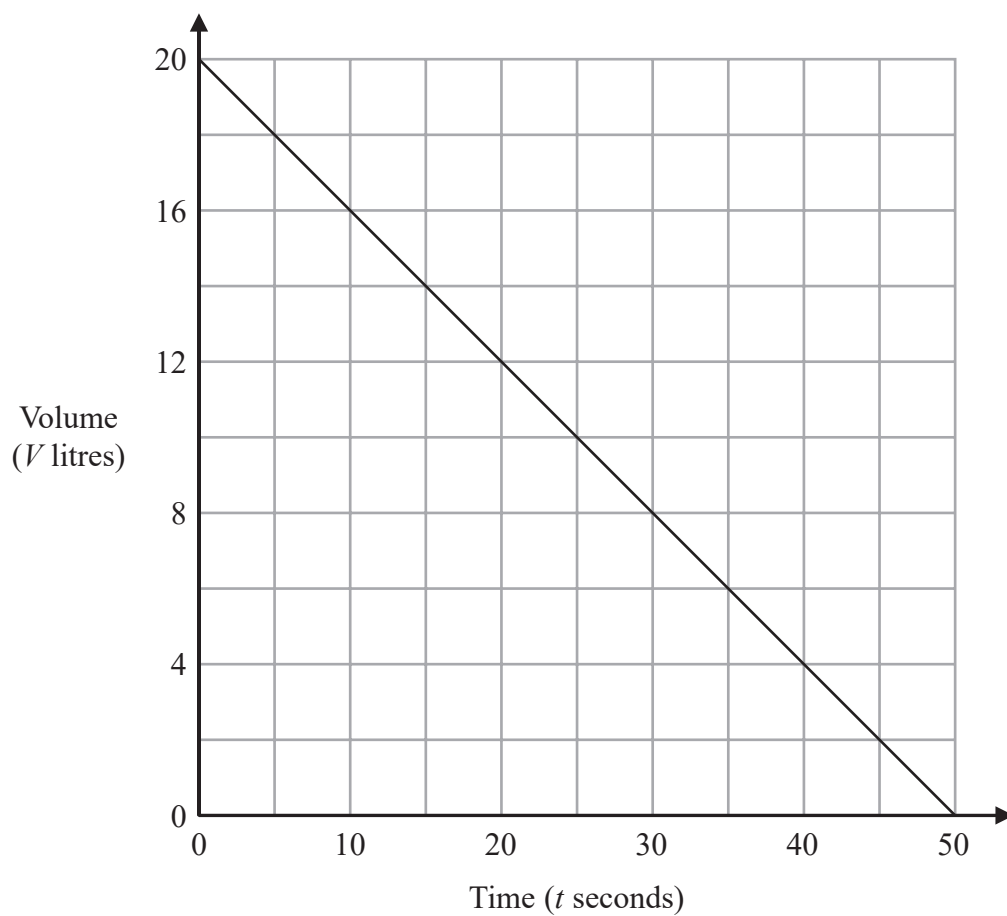
Angle d is three times the size of angle c

Angle e is two times the size of angle c

Work out the size of angle a

(Total for Question 6 is 4 marks)

- 7 The graph shows the volume of water, V litres, in a tank at time t seconds.



What does the gradient of this graph represent?

(Total for Question 7 is 1 mark)

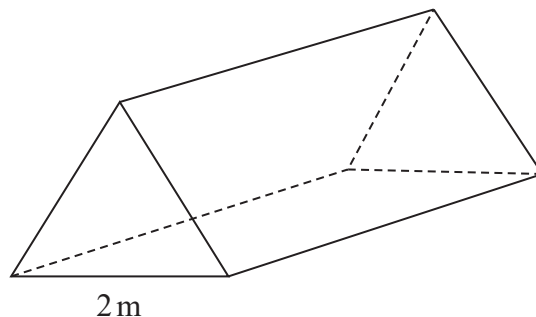


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- 8 The diagram shows a solid triangular prism on a horizontal floor.



$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

The face in contact with the floor is a rectangle of width 2 m.

The pressure on the floor due to the prism is 80 newtons/m²

The force exerted by the prism on the floor is 720 newtons.

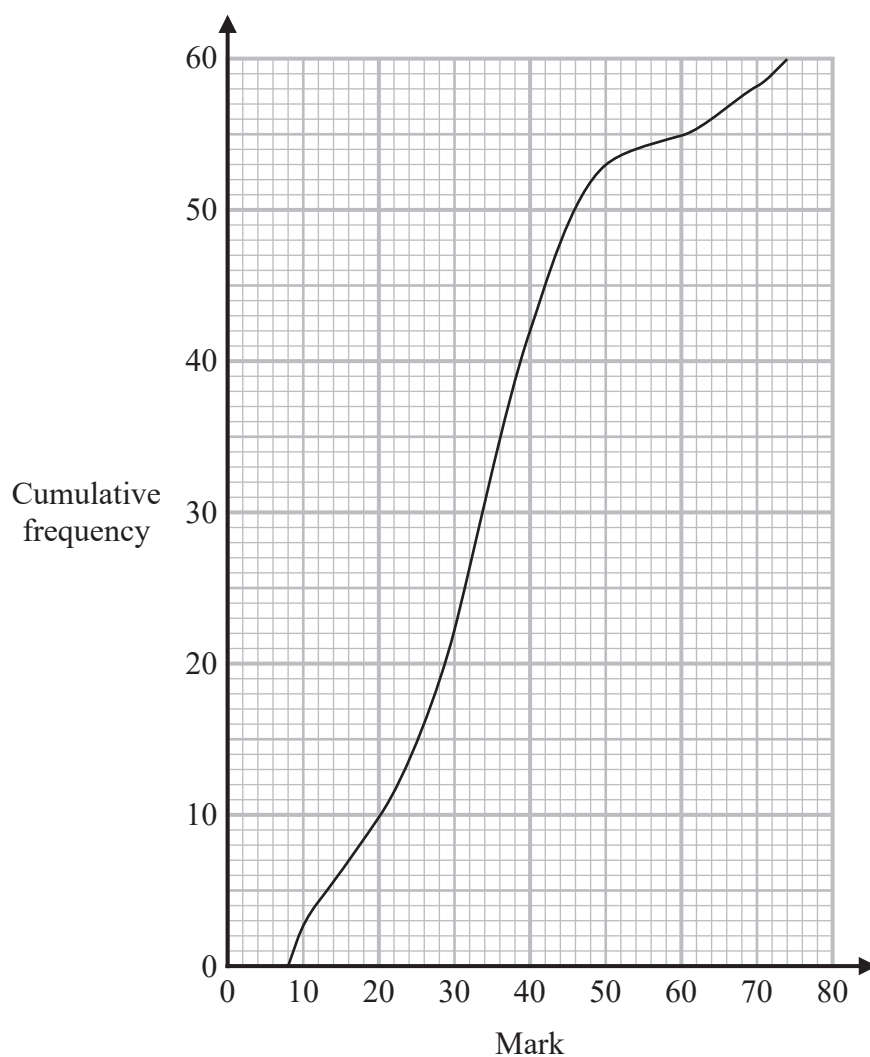
Work out the length of the prism.

..... m

(Total for Question 8 is 3 marks)

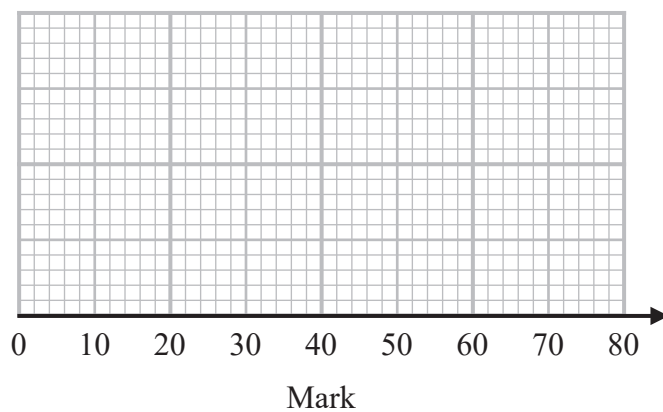


- 9 The cumulative frequency graph gives information about the marks that 60 students got in a test.



For these 60 students
 the highest mark was 74
 the lowest mark was 8

- (a) On the grid below, draw a box plot for the distribution of the marks.



(3)

The pass mark for the test was 40

Sian says,

“30% of the 60 students passed the test.”

(b) Is Sian correct?

You must show how you get your answer.

(3)

(Total for Question 9 is 6 marks)

10 (a) Work out $25^{\frac{1}{2}} \times 8^{\frac{1}{3}}$

(2)

(b) Find the value of $\left(\frac{1}{32}\right)^{\frac{3}{5}}$

(2)

(Total for Question 10 is 4 marks)



11 Kate was asked to factorise $x^2 + 5x + 6$ in the form $(x + a)(x + b)$

Kate says,

“The sum of a and b must be 6 and the product of a and b must be 5”

(a) Explain what is wrong with Kate’s statement.

(1)

(b) Factorise fully $2m^2 - 2$

(2)

(c) Factorise fully $ax + bx - ay - by$

(2)

(Total for Question 11 is 5 marks)



12 **A**, **B** and **C** are three solid spheres.

Sphere **A** has a volume of 64 cm^3

Sphere **B** has a volume of 125 cm^3

The radius of sphere **C** is 50% of the radius of sphere **B**.

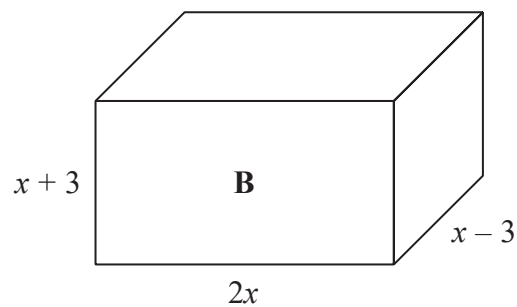
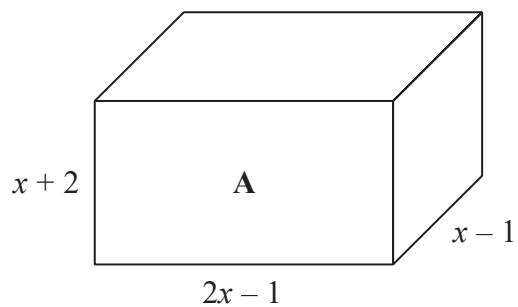
Work out the ratio of the surface area of sphere **A** to the surface area of sphere **C**.

Give your answer in the form $a:b$ where a and b are integers.

(Total for Question 12 is 4 marks)



13 Here are two cuboids.



All lengths are measured in centimetres.

The volume of cuboid A is 142 cm^3 greater than the volume of cuboid B.

Work out the value of x .

$x = \dots\dots\dots$

(Total for Question 13 is 5 marks)

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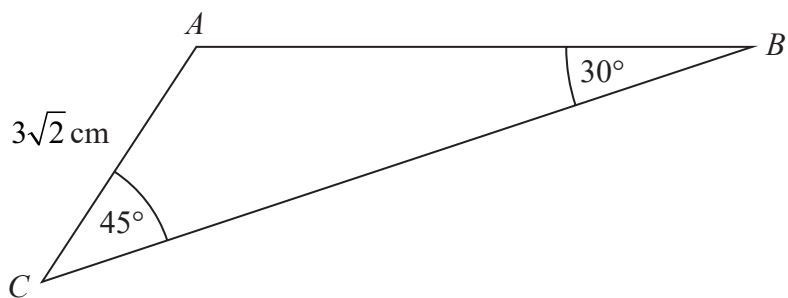
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14 ABC is a triangle.



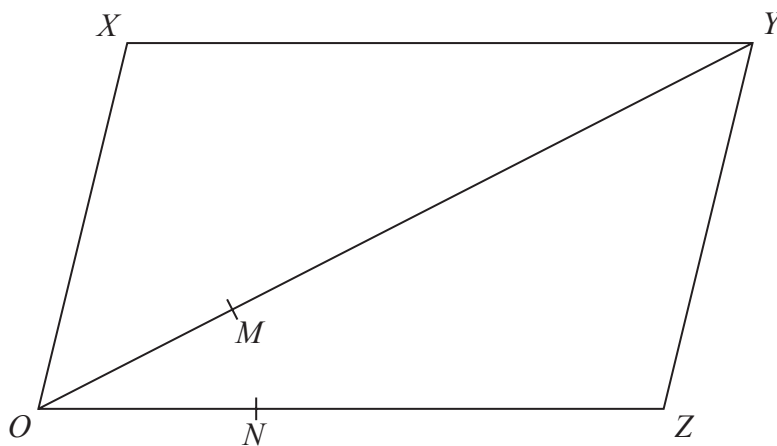
Work out the length of AB .

..... cm

(Total for Question 14 is 3 marks)



15 $OXYZ$ is a parallelogram.



$$\vec{OY} = \mathbf{a} \text{ and } \vec{OZ} = \mathbf{b}$$

M is the point on OY such that $OM:MY = 1:3$

N is the point on OZ such that $ON:NZ = 1:2$

Work out the ratio $XN:MN$

You must show all your working.

(Total for Question 15 is 4 marks)



- 16 (a) Rationalise the denominator of $\frac{15}{\sqrt{5}}$
Give your answer in its simplest form.

.....
(2)

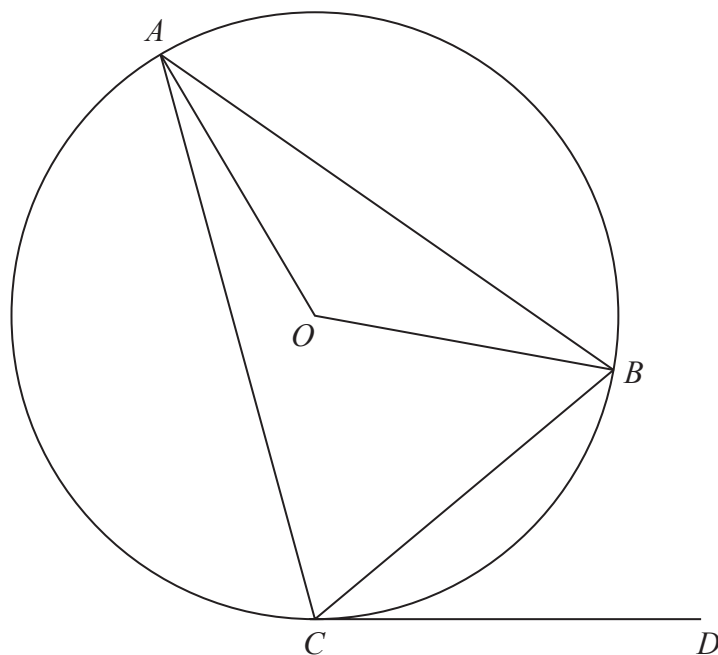
- (b) Write $\frac{\sqrt{75} - 2}{1 + 2\sqrt{3}}$ in the form $\frac{a - b\sqrt{3}}{c}$ where a , b and c are integers.

.....
(4)

(Total for Question 16 is 6 marks)



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



CD is a tangent to the circle.

Angle $BCD = 40^\circ$

Angle $OAB = 3 \times \text{angle } OAC$

Work out the size of angle ACD .

Write down any circle theorems that you use.

(Total for Question 17 is 4 marks)



18 $f(x) = \frac{5x-3}{4}$

(a) Find $f^{-1}(x)$

$$f^{-1}(x) = \dots\dots\dots (2)$$

For all values of x

$$g(x) = (x-1)^2 \text{ and } h(x) = 1-2x$$

(b) Work out the value of $gh(5)$

$$gh(5) = \dots\dots\dots (2)$$

(Total for Question 18 is 4 marks)



- 19** In the semi-finals of a chess tournament,
player **A** will play player **B**
and player **C** will play player **D**.

The two winners will then play each other in the final.

The probability that player **A** will win against player **B** is 0.6

The probability that player **A** will win against player **C** is 0.5

The probability that player **A** will win against player **D** is 0.3

The probability that player **C** will win against player **D** is 0.2

Work out the probability that player **A** will win the chess tournament.

(Total for Question 19 is 4 marks)



20 C is the circle with equation $x^2 + y^2 = 4$

Find an equation of the tangent to C at the point $(p, 1)$ where $p > 0$

Give your answer in the form $y + \sqrt{a}x = b$ where a and b are integers.

You must show all your working.

(Total for Question 20 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS



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