

Write your name and the date clearly.

Name

Date

Teach Me Maths

GCSE (9–1) Mathematics

For Pearson Edexcel GCSE Mathematics (1MA1)

Mock Set A

Time: 1 hour 30 minutes

Mathematics

PAPER 3 (Calculator)

Higher Tier

You must have: a ruler marked in centimetres and millimetres, a protractor, a pair of compasses, a pen, an HB or B pencil, an eraser, a calculator and the Formulae Sheet (last page). You may use tracing paper.

Total Marks

out of 80

Instructions

- Use **black** ink or a ball-point pen.
- If you use a pencil for diagrams, sketches or graphs, it must be dark (HB or B).
- **Write your name and the date** in the box at the top of this page.
- Answer **all** questions.
- Write your answers in the spaces provided – you may not need all the space.
- You must **show all your working**.
- Diagrams are **NOT** drawn accurately, unless the question says they are.
- You may use a calculator.
- If your calculator does not have a π button, use 3.142 for π unless the question says otherwise.

Information

- This paper is out of 80 marks.
- The marks for **each** question are shown in brackets – use them to judge how long to spend on each question.

Advice

- Read each question carefully before you start your answer.
- Try to answer every question.
- If you have time at the end, check your answers.

Practice paper written by Teach Me Maths in the style of Pearson Edexcel GCSE Mathematics (1MA1). Not an official Pearson Edexcel paper.

Turn over ►

Answer **ALL** questions. Write your answers in the spaces provided.
You must write down all the stages in your working.

1 $V = 2u^2 - 5u$

Joel works out the value of V when $u = -4$

Here is his working.

$$V = 2 \times -4^2 - 5 \times -4$$

$$V = 2 \times -16 + 20$$

$$V = -12$$

Joel's answer is wrong.

(a) What mistake has Joel made?

(1)

(b) Work out the correct value of V when $u = -4$

.....
(1)
(Total for Question 1 is 2 marks)

- 2** In a sailing race, the boats sail around two buoys, A and B .

The bearing of B from A is 124°

Work out the bearing of A from B .

.....^o
(2)

(Total for Question 2 is 2 marks)

- 3** Idris goes on a journey.

First he travels 51 km by ferry at an average speed of 34 km/h.

He then travels straight on by coach for 2 hours 40 minutes at an average speed of 57 km/h.

Work out Idris's average speed for the whole journey.

Give your answer correct to 1 decimal place.

..... km/h
(3)

(Total for Question 3 is 3 marks)

4 Bethan runs a market stall.

She buys 150 bunches of flowers for a total of £315

She sells 128 of the bunches for £3.75 each.

She sells the rest of the bunches at a reduced price of £1.50 each.

Work out Bethan's percentage profit.

Give your answer correct to 1 decimal place.

..... %
(3)

(Total for Question 4 is 3 marks)

5 A theatre has 640 seats.

For the Saturday matinee, $\frac{5}{8}$ of the seats are sold at the full price of £28.50 each.

Then $\frac{3}{4}$ of the remaining seats are sold at the concession price of £17 each.

Of the seats still left, 25% are given free to a local school and the rest are sold on the day for £12 each.

Work out the total income from ticket sales for the Saturday matinee.

You must show all your working.

£
(4)

(Total for Question 5 is 4 marks)

- 6 (a) Change 0.42 m^2 into cm^2

..... cm^2
(1)

- (b) Esme's drone has a top speed of 19 metres per second.
Marcus's drone has a top speed of 65 kilometres per hour.
Whose drone has the greater top speed?
You must show how you get your answer.

(2)

(Total for Question 6 is 3 marks)

- 7** Amira, Josh and Kezia are cousins.
Josh's age is 5 years more than twice Amira's age.
Kezia is 4 years younger than Josh.
In 4 years' time, the total of their three ages will be 78 years.
Work out the age of the oldest cousin now.

..... years
(4)

(Total for Question 7 is 4 marks)

- 8 PQR and PRS are right-angled triangles.

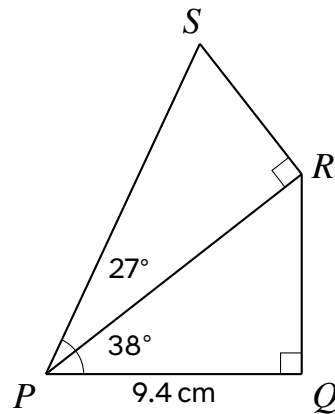


Diagram **NOT** accurately drawn

Work out the length of RS .

Give your answer correct to 3 significant figures.

..... cm
(3)

(Total for Question 8 is 3 marks)

9 Each member of a gym is given a membership code.

The code is made of 2 letters followed by 2 digits, for example KP47

The letters can be any of the 26 letters of the alphabet and can be the same.

The two digits must be different.

Work out how many different codes are possible.

.....
(2)

(Total for Question 9 is 2 marks)

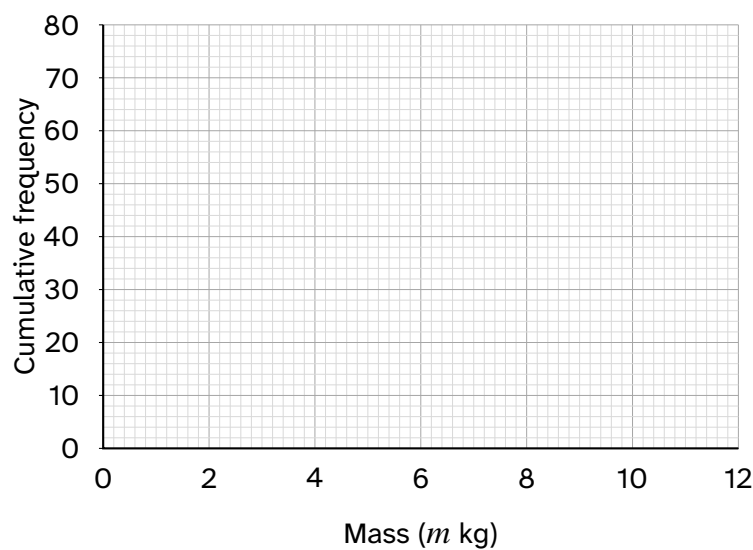
10 The table gives information about the masses, in kg, of 80 cabin bags.

Mass (m kg)	$0 < m \leq 2$	$2 < m \leq 4$	$4 < m \leq 6$	$6 < m \leq 8$	$8 < m \leq 10$	$10 < m \leq 12$
Frequency	9	21	26	14	7	3
Cumulative frequency						

(a) Complete the cumulative frequency row in the table.

(1)

(b) On the grid, draw a cumulative frequency graph for your table.



(2)

(c) The airline's weight limit for a cabin bag is 7 kg.

Sofia says, "More than a quarter of these bags are over the limit."

Is Sofia correct?

You must show how you get your answer.

(2)

(Total for Question 10 is 5 marks)

- 11** A farmer has a water tank for his animals.
The tank is in the shape of a cylinder.
The tank has radius 60 cm and height 1.5 m.

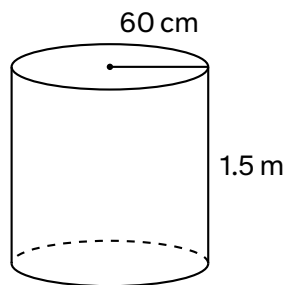


Diagram **NOT** accurately drawn

The tank is empty.
Water flows into the tank at a constant rate of 18 litres per minute.
Work out how long it takes to fill the tank to $\frac{2}{3}$ of its height.
Give your answer in minutes and seconds, correct to the nearest second.

.....

(4)

(Total for Question 11 is 4 marks)

- 12** Show that $(3x - 1)(x + 2)(x - 5)$ can be written in the form $ax^3 + bx^2 + cx + d$ where a, b, c and d are integers.

(3)

(Total for Question 12 is 3 marks)

- 13** 8 volunteers take 2 hours 15 minutes to clear the litter from a beach.

- (a) How long would it take 5 volunteers to clear the litter from the same beach?
Give your answer in hours and minutes.

.....
(2)

- (b) State one assumption you made in working out your answer to part (a).

(1)

(Total for Question 13 is 3 marks)

14 An aquarium tank is in the shape of a cuboid.

The length of the base of the tank is 90 cm, correct to the nearest centimetre.

The width of the base of the tank is 38 cm, correct to the nearest centimetre.

The capacity of the tank is 150 litres, correct to the nearest 10 litres.

Nisha says, “The height of the tank must be less than 46 cm.”

By considering bounds, determine whether Nisha is correct.

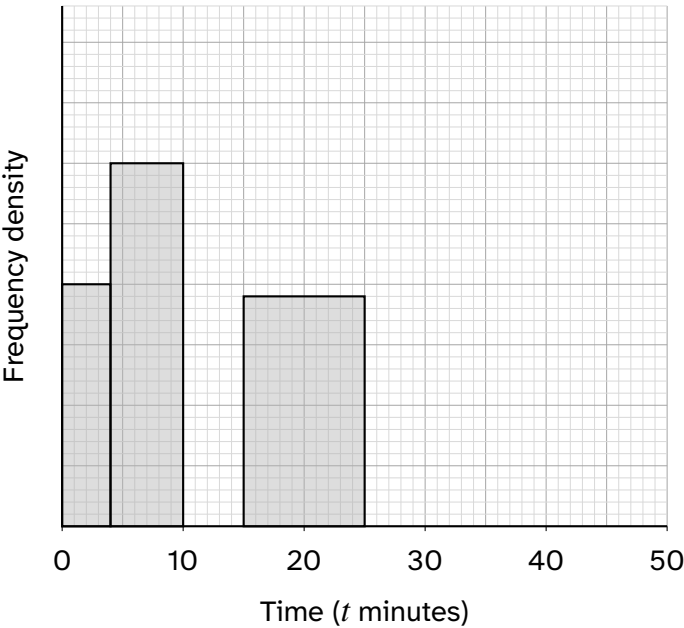
You must show all your working.

(4)

(Total for Question 14 is 4 marks)

15 The incomplete table and the incomplete histogram give information about the times, in minutes, that 150 customers spent in a bookshop.

Time (t minutes)	Frequency
$0 < t \leq 4$	16
$4 < t \leq 10$	
$10 < t \leq 15$	40
$15 < t \leq 25$	38
$25 < t \leq 45$	20



- (a) Use the histogram to complete the table.

(1)
- (b) Use the table to complete the histogram.

(2)
- (c) Work out an estimate for the number of customers who spent between 8 minutes and 20 minutes in the bookshop.

.....

(2)

(Total for Question 15 is 5 marks)

- 16** The number of birds of one species on an island is recorded at the start of each year.

P_n is the number of birds n years after the start of 2025

$P_0 = 3200$ and $P_{n+1} = kP_n$ where k is a constant.

$P_2 = 2738$

- (a) Work out the value of k .

$k = \dots\dots\dots$
(2)

- (b) Write down what your value of k tells you about the number of birds on the island.

(1)

(Total for Question 16 is 3 marks)

- 17 (a) Show that the equation $x^3 - 5x - 3 = 0$ has a solution between $x = 2$ and $x = 3$

(2)

- (b) Show that the equation $x^3 - 5x - 3 = 0$ can be rearranged to give $x = \sqrt[3]{5x + 3}$

(1)

- (c) Starting with $x_0 = 2.5$, use the iteration formula $x_{n+1} = \sqrt[3]{5x_n + 3}$ three times to find an estimate for a solution of $x^3 - 5x - 3 = 0$

.....
(3)

(Total for Question 17 is 6 marks)

18 A bucket is in the shape of a frustum of a cone.

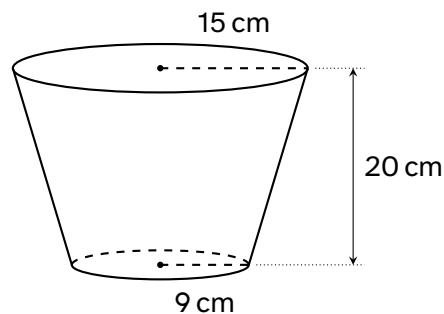
The frustum is made by removing a small cone from a large cone.

The top of the bucket is a circle of radius 15 cm.

The base of the bucket is a circle of radius 9 cm.

The vertical height of the bucket is 20 cm.

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



*Diagram **NOT** accurately drawn*

Work out the capacity of the bucket.

Give your answer in litres, correct to 3 significant figures.

You must show all your working.

..... litres
(4)

(Total for Question 18 is 4 marks)

19 $ABCD$ is a square.

P is a point on AB and Q is a point on AD such that $AP = AQ$.

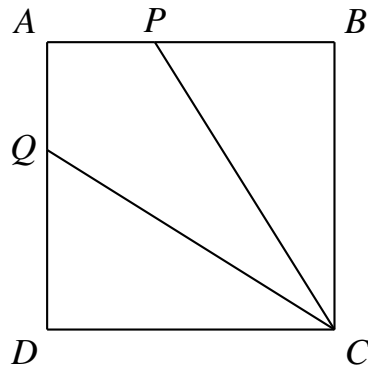


Diagram **NOT** accurately drawn

Prove that triangle CBP is congruent to triangle CDQ .

(3)

(Total for Question 19 is 3 marks)

20 Solve $\frac{7}{x+2} + \frac{2}{x-3} = 2$

.....

(4)

(Total for Question 20 is 4 marks)

21 $VABCD$ is a pyramid.

The base $ABCD$ is a horizontal rectangle with $AB = 14$ cm and $BC = 9$ cm.

V is vertically above the centre of the rectangle.

The volume of the pyramid is 630 cm^3

Volume of pyramid = $\frac{1}{3} \times \text{area of base} \times \text{vertical height}$
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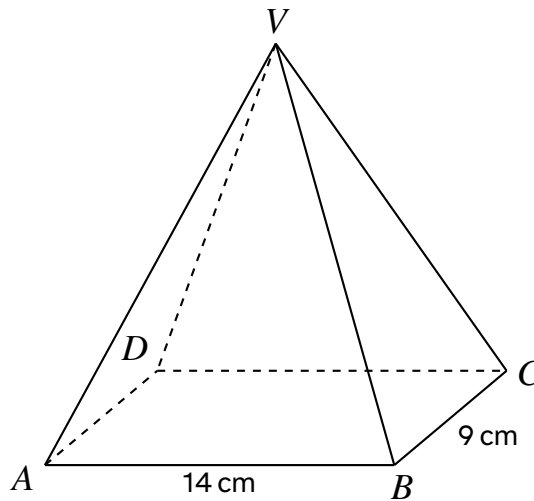


Diagram **NOT** accurately drawn

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

Give your answer correct to 1 decimal place.

.....^o
(4)

(Total for Question 21 is 4 marks)

- 22** L is the straight line with equation $x + y = 5$
 C is the curve with equation $y = 2x^2 - 3x - 4$
 L and C intersect at the points A and B .
Work out the length of AB .
Give your answer correct to 3 significant figures.
You must show all your working.

.....
(6)

(Total for Question 22 is 6 marks)

TOTAL FOR PAPER IS 80 MARKS

Formulae Sheet

For Pearson Edexcel GCSE Mathematics (1MA1) • Higher Tier

Perimeter, area and volume

Where a and b are the lengths of the parallel sides and h is their perpendicular separation:

$$\text{Area of a trapezium} = \frac{1}{2}(a + b)h$$

Volume of a prism = area of cross section $\times$ length

Where r is the radius and d is the diameter:

$$\text{Circumference of a circle} = 2\pi r = \pi d$$

$$\text{Area of a circle} = \pi r^2$$

Quadratic formula

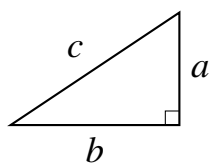
The solution of
 $ax^2 + bx + c = 0$
where $a \neq 0$:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Pythagoras' Theorem and Trigonometry

In any right-angled triangle where a , b and c are the lengths of the sides and c is the hypotenuse:

$$a^2 + b^2 = c^2$$

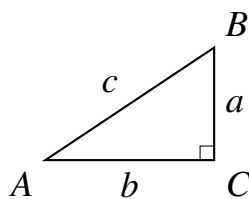


In any right-angled triangle ABC where a , b and c are the lengths of the sides and c is the hypotenuse:

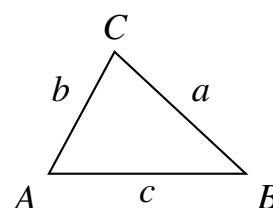
$$\sin A = \frac{a}{c}$$

$$\cos A = \frac{b}{c}$$

$$\tan A = \frac{a}{b}$$



In any triangle ABC where a , b and c are the lengths of the sides:



$$\text{sine rule: } \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\text{cosine rule: } a^2 = b^2 + c^2 - 2bc \cos A$$

$$\text{Area of triangle} = \frac{1}{2}ab \sin C$$

Compound Interest

Where P is the principal amount, r is the interest rate over a given period and n is the number of times that the interest is compounded:

$$\text{Total accrued} = P \left(1 + \frac{r}{100} \right)^n$$

Probability

Where $P(A)$ is the probability of outcome A and $P(B)$ is the probability of outcome B :

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$P(A \text{ and } B) = P(A \text{ given } B) P(B)$$