

Write your name and the date clearly.

Name

Date

Teach Me Maths

GCSE (9–1) Mathematics

For Pearson Edexcel GCSE Mathematics (1MA1)

Mock Set B

Time: 1 hour 30 minutes

Mathematics

PAPER 2 (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 Use your calculator to work out the value of

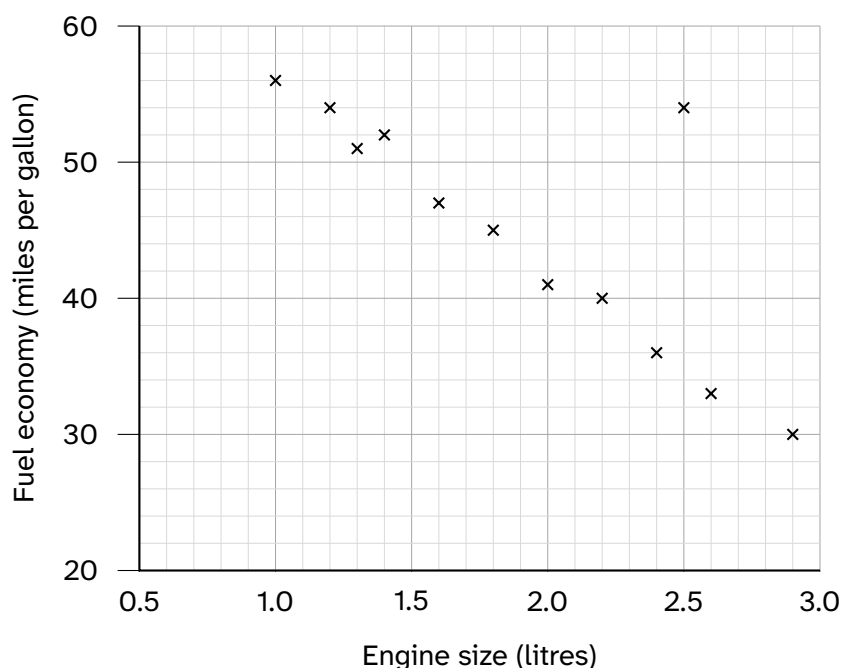
$$\frac{\sqrt[3]{68.9} + \sqrt{14.2}}{7.31 - 2.86}$$

Write down all the figures on your calculator display.

.....
(2)

(Total for Question 1 is 2 marks)

- 2 The scatter graph shows information about the engine size and the fuel economy of each of 12 cars.



- (a) What type of correlation does this scatter graph show?

.....
(1)

- (b) One of the points is an outlier.

Write down the coordinates of this point.

(..... ,)
(1)

- (c) Elliot wants to use this scatter graph to estimate the fuel economy of a car with an engine size of 4.5 litres.

Explain why his estimate may not be reliable.

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

(Total for Question 2 is 3 marks)

3 Solve $6(3 - x) = 2x + 7$

Show clear algebraic working.

$x = \dots\dots\dots$
(3)

(Total for Question 3 is 3 marks)

- 4** Last year, the price of a cinema ticket was £10.85 and the price of a large popcorn was £5.40

This year, the price of a cinema ticket is £12.20 and the price of a large popcorn is £6.15

Kian says,

“The price of the cinema ticket went up by the greater percentage, because it went up by more money.”

Is Kian correct?

You must show all your working.

(3)

(Total for Question 4 is 3 marks)

5 Anya invests £7500 in a savings account.

The account pays compound interest at

4.6% for the first year

2.85% per year for each year after the first year.

At the end of how many years will Anya's investment first be worth more than £8800?

You must show all your working.

..... years

(3)

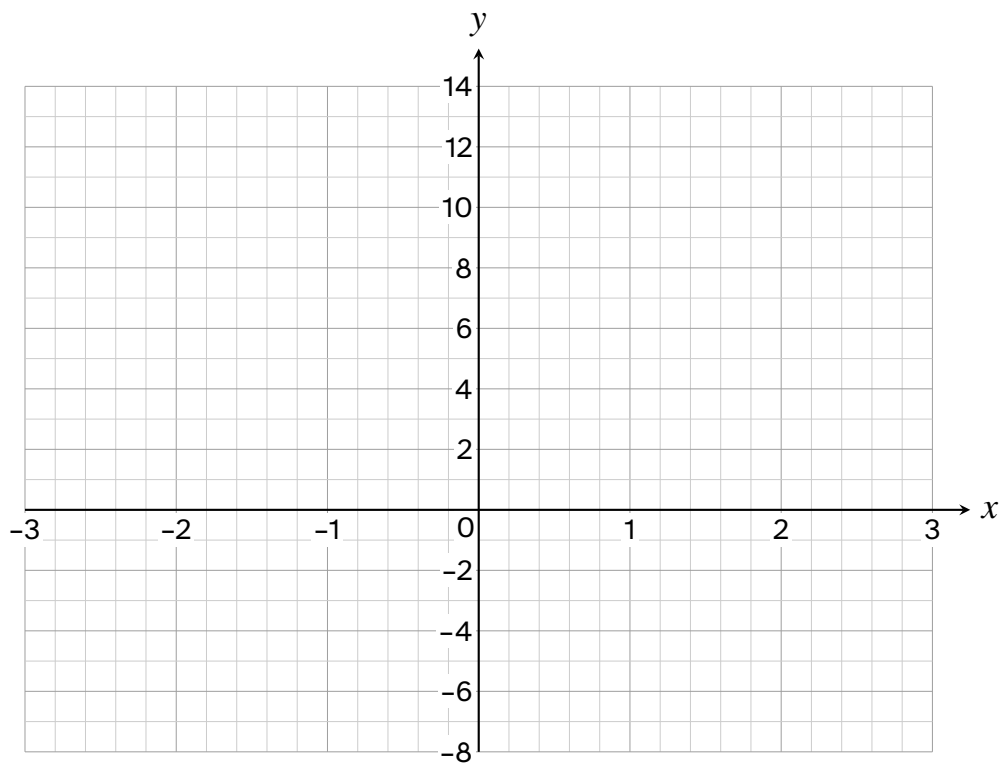
(Total for Question 5 is 3 marks)

- 6 (a) Complete the table of values for $y = x^3 - 6x + 3$

x	-3	-2	-1	0	1	2	3
y	-6		8	3		-1	

(2)

- (b) On the grid, draw the graph of $y = x^3 - 6x + 3$ for values of x from -3 to 3



(2)

(Total for Question 6 is 4 marks)

7 Graphene is a material made of very thin sheets.

One sheet of graphene is 0.000 000 34 mm thick.

A scientist makes a stack of 6.5×10^5 sheets of graphene.

Work out the total thickness of the stack.

Give your answer in millimetres, in standard form.

..... mm
(2)

(Total for Question 7 is 2 marks)

8 The point A has coordinates $(-5, 8)$ and the point B has coordinates $(8, -2)$

Calculate the distance AB .

Give your answer correct to 3 significant figures.

.....
(2)

(Total for Question 8 is 2 marks)

- 9** A nurse, Efe, sets up a drip to give a patient 1.25 litres of fluid.

The fluid is given at a constant rate over 6 hours.

Each drop of fluid has a volume of 0.05 ml.

How many drops per minute should the drip deliver?

Give your answer correct to the nearest whole number.

.....
(3)

(Total for Question 9 is 3 marks)

- 10** Expand and simplify $(x + 4)(x - 7)(x + 2)$

.....
(3)

(Total for Question 10 is 3 marks)

- 11** The diagram shows a wheelchair ramp.
The ramp rises 0.45 m over a horizontal distance of 5.4 m.
The angle between the ramp and the ground is x .

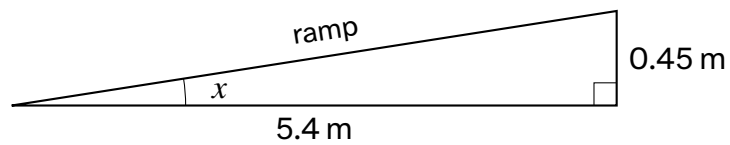


Diagram **NOT** accurately drawn

For safety, a wheelchair ramp must make an angle of less than 5° with the horizontal ground.

Is this ramp safe?

You must show how you get your answer.

(2)

(Total for Question 11 is 2 marks)

- 12** Iqra asks 150 visitors to a zoo whether they went to the café and whether they went to the gift shop.

$\frac{3}{5}$ of the visitors went to the gift shop.

30% of the visitors who went to the gift shop also went to the café.

28 visitors went to neither the café nor the gift shop.

One of the visitors who went to the café is chosen at random.

Work out the probability that this visitor also went to the gift shop.

You must show all your working.

.....
(4)

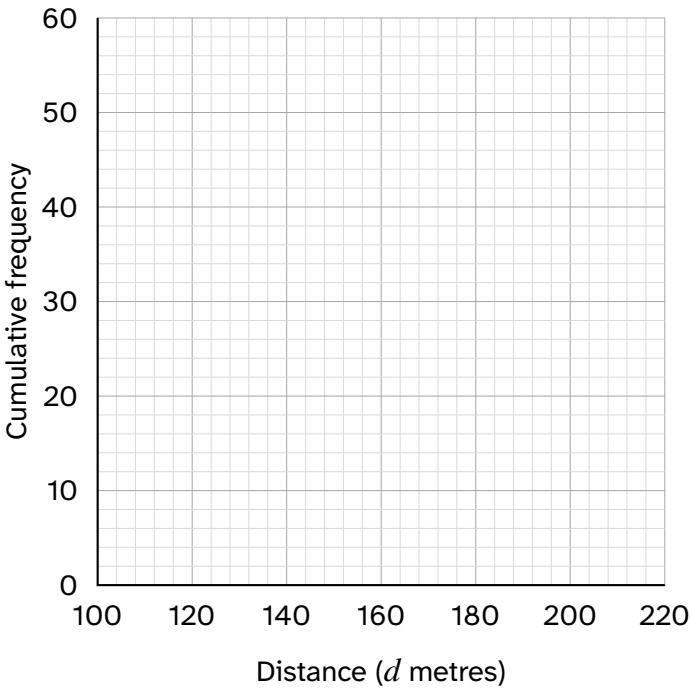
(Total for Question 12 is 4 marks)

13 Isaac hits 60 golf balls at a driving range.

The table shows information about the distances, d metres, that the balls travelled.

Distance (d m)	$100 < d \leq 120$	$120 < d \leq 140$	$140 < d \leq 160$	$160 < d \leq 180$	$180 < d \leq 200$	$200 < d \leq 220$
Frequency	4	9	15	18	10	4

(a) On the grid, draw a cumulative frequency graph for this information.



(2)

(b) Use your graph to find an estimate for the median distance.

..... m
(1)

(c) Use your graph to find an estimate for the interquartile range.

..... m
(2)

(Total for Question 13 is 5 marks)

14 Raj, Sid and Tom run a gardening business together.

They share the profit for one year in the ratio

Raj's share : Sid's share : Tom's share = 5: 4: 3

Sid's share is £1460

Raj then gives some of his share to Tom.

Sid keeps all of his share.

Tom now has 40% of the total profit.

How much money did Raj give to Tom?

You must show all your working.

£
(4)

(Total for Question 14 is 4 marks)

15 F is inversely proportional to the square of d .

$$F = 12.5 \text{ when } d = 3.2$$

(a) Find a formula for F in terms of d .

.....
(2)

(b) The value of F is halved.

Work out the percentage increase in the value of d .

Give your answer correct to 1 decimal place.

..... %
(2)

(Total for Question 15 is 4 marks)

16 (a) Show that the equation $x^3 + 6x - 13 = 0$ can be rearranged to give $x = \frac{13}{x^2 + 6}$

(1)

(b) Starting with $x_0 = 1.5$, use the iteration formula $x_{n+1} = \frac{13}{x_n^2 + 6}$ three times to find an estimate for a solution of $x^3 + 6x - 13 = 0$
Give your answer correct to 4 decimal places.

.....
(3)

(Total for Question 16 is 4 marks)

- 17** Show that $\frac{4}{x+5} - \frac{x-27}{x^2+2x-15}$ simplifies to $\frac{a}{x+b}$
where a and b are integers.

(3)

(Total for Question 17 is 3 marks)

18 PQR is a triangle.

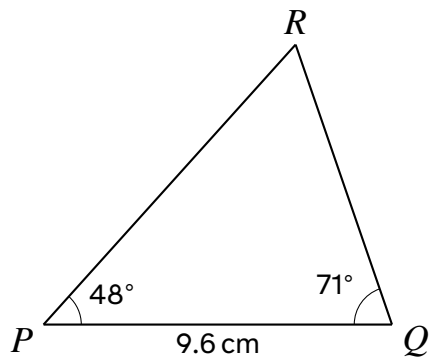


Diagram **NOT** accurately drawn

Work out the length of QR .

Give your answer correct to 3 significant figures.

..... cm
(3)

(Total for Question 18 is 3 marks)

19 (a) Write $x^2 + 10x + 34$ in the form $(x + p)^2 + q$ where p and q are integers.

.....
(2)

(b) Hence, explain why the curve with equation $y = x^2 + 10x + 34$ does not cross the x -axis.

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

(Total for Question 19 is 3 marks)

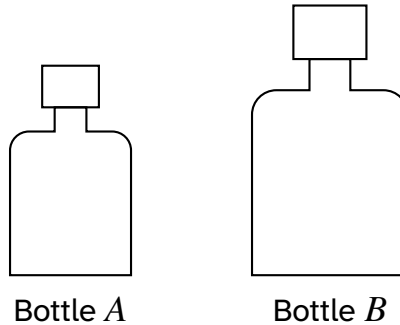
20 Bottle A and bottle B are two mathematically similar perfume bottles.

Both bottles are made from the same type of glass.

The mass of bottle A is 150 g.

The mass of bottle B is 320 g.

The total surface area of bottle B is 230 cm^2



*Diagram **NOT** accurately drawn*

Work out the total surface area of bottle A .

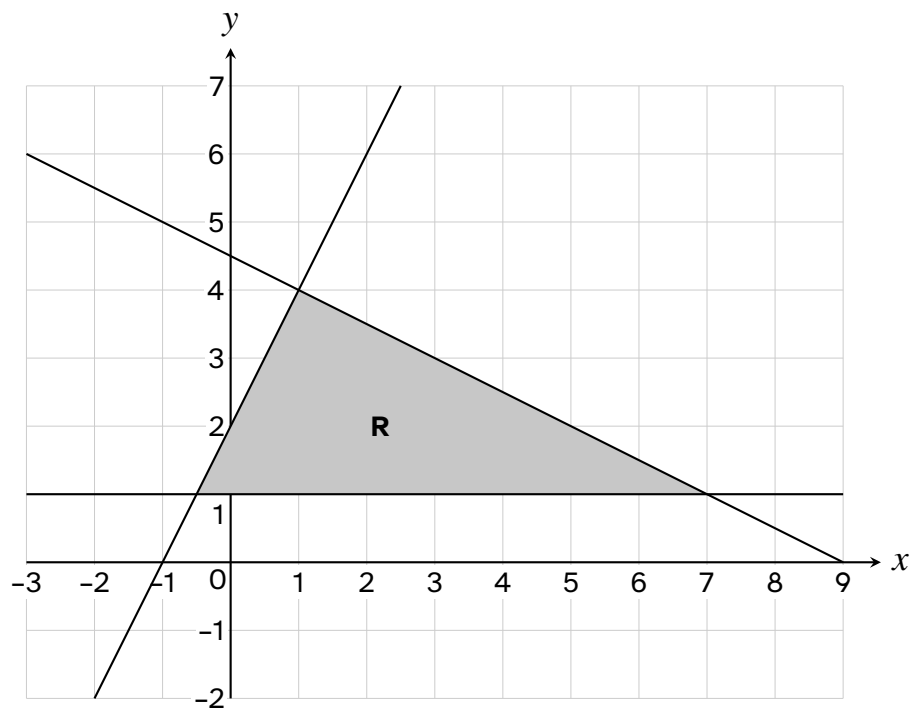
Give your answer correct to 3 significant figures.

You must show all your working.

..... cm^2
(4)

(Total for Question 20 is 4 marks)

21 The shaded region **R** is bounded by three straight lines.



Find the three inequalities that define the shaded region **R**.

(3)

(Total for Question 21 is 3 marks)

22 A is the point $(-4, 6)$ and B is the point $(4, 2)$

The point C lies on the line with equation $y = 3x - 1$

C is the same distance from A as it is from B .

Find the coordinates of C .

You must show all your working.

(..... ,)
(4)

(Total for Question 22 is 4 marks)

23 Victor rides his motorbike around a race track.

The length of the track is 3.85 km, correct to the nearest 10 metres.

Victor takes 2 minutes 34 seconds to ride once around the track, correct to the nearest second.

The lap record for this track is an average speed of 89.7 km/h.

Victor says,

“I have definitely beaten the lap record.”

Is Victor correct?

You must show all your working and give a reason for your answer.

(5)

(Total for Question 23 is 5 marks)

24 The diagram shows a cuboid $ABCDEFGH$ with a horizontal base $ABCD$.

$AB = 8.6 \text{ cm}$ and $BC = 6.4 \text{ cm}$

Angle $FAB = 31^\circ$

M is the midpoint of the edge GH .

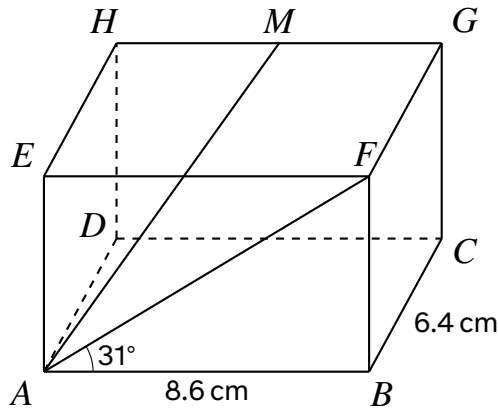


Diagram **NOT** accurately drawn

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

Give your answer correct to 1 decimal place.

.....[°]
(4)

(Total for Question 24 is 4 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

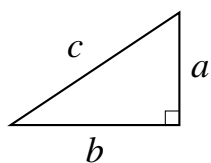
The solution of
 $ax^2 + bx + c = 0$
where $a \neq 0$:

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

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:

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

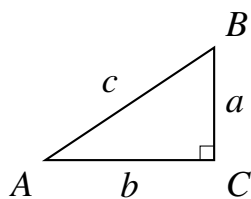


In any right-angled triangle ABC where a , b and c are the lengths of the sides and c is the hypotenuse:

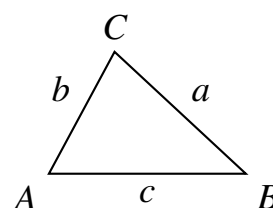
$$\sin A = \frac{a}{c}$$

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

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



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 :

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

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