

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 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** Lighthouse *A* flashes every 42 seconds.
Lighthouse *B* flashes every 54 seconds.
At 9 pm the two lighthouses flash at the same time.

Amelia says,

“They will next flash at the same time before 9.05 pm.”

Is Amelia correct?

You must show how you get your answer.

(3)

(Total for Question 1 is 3 marks)

2 (a) Simplify $(t^{-2})^{-4}$

.....
(1)

(b) Expand $5p^2(2p - 3q)$

.....
(1)

(c) Factorise fully $21c^2d + 35cd^3$

.....
(2)

(Total for Question 2 is 4 marks)

3 When Shanice truncates the number w to 1 decimal place, she gets 26.8
Complete the error interval for w .

..... $\leq w <$
(2)

(Total for Question 3 is 2 marks)

- 4 The scale drawing shows a rectangular garden $ABCD$.

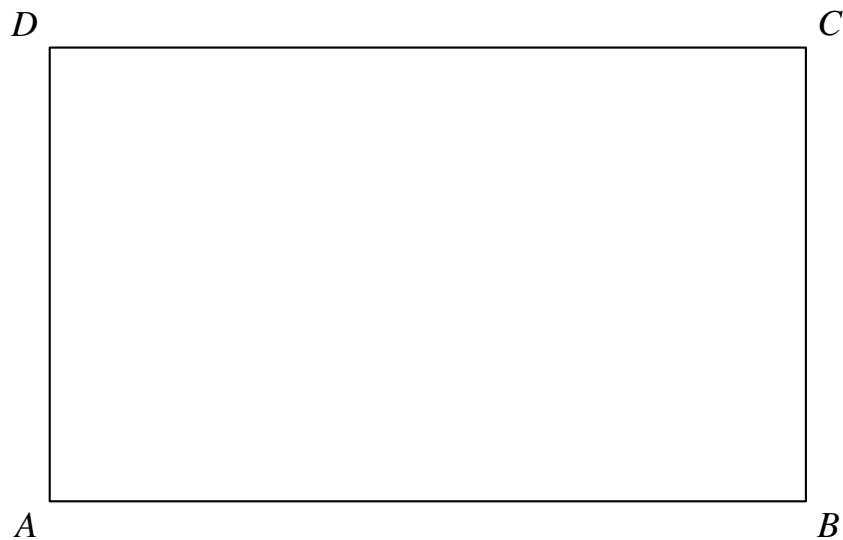
Hugo is going to put a bird table in the garden.

The bird table must be

closer to AB than to AD

and

less than 5 m from C .



Scale: 1 cm represents 1 m

On the diagram, shade the region where Hugo can put the bird table.

Label the region R .

You must show all your construction lines.

(3)

(Total for Question 4 is 3 marks)

5 Solder is an alloy of tin and lead.

mass of tin : mass of lead = 3:2

The density of tin is 7.3 g/cm^3

The density of lead is 11.3 g/cm^3

A reel of solder wire contains 14 cm^3 of solder.

Work out the mass of the solder on the reel.

Give your answer correct to 3 significant figures.

You must show all your working.

..... g
(4)

(Total for Question 5 is 4 marks)

6 Yasmin wants to buy 48 phone cases for her market stall.

She can buy them from a supplier in Ireland or from a supplier in England.

Supplier in Ireland	Supplier in England
Pack of 6 phone cases for €27.30	Pack of 8 phone cases for £31.40
Delivery charge €12 for each order	Free delivery

The exchange rate is £1 = €1.18

Yasmin wants to buy the 48 phone cases as cheaply as possible.

Which supplier should she use?

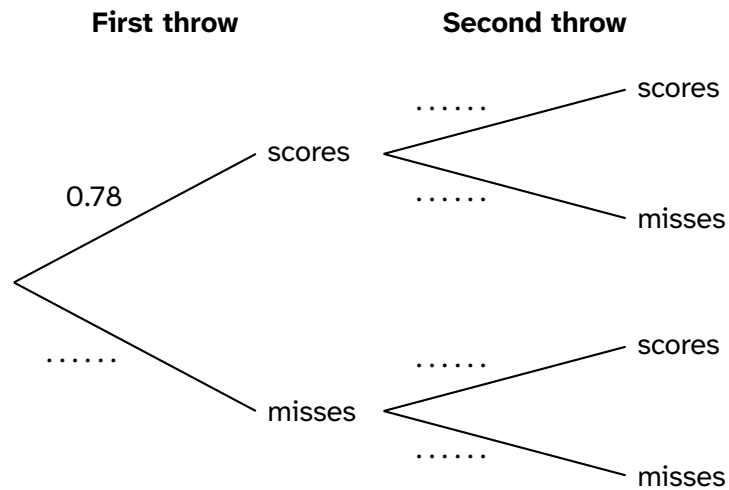
You must show how you get your answer.

(4)

(Total for Question 6 is 4 marks)

- 7** Parveen plays basketball.
 She takes two free throws.
 The probability that she scores with a free throw is 0.78
 The two throws are independent.

(a) Complete the probability tree diagram.



(2)

(b) Ayesha says,

“The probability that Parveen scores with exactly one of her two throws
 is $0.78 \times 0.22 = 0.1716$ ”

Is Ayesha correct?

You must give a reason for your answer.

(2)

(Total for Question 7 is 4 marks)

- 8 The diagram shows a triangle and a rectangle.

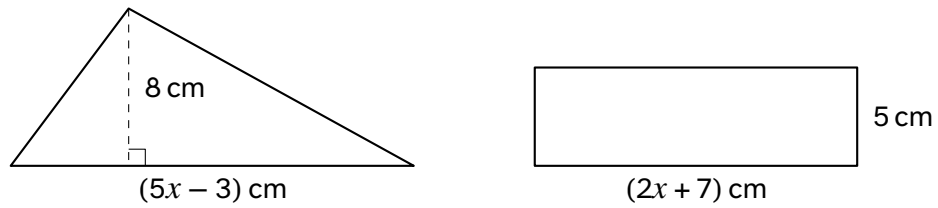


Diagram **NOT** accurately drawn

The area of the triangle is equal to the area of the rectangle.

Work out the perimeter of the rectangle.

You must show all your working.

..... cm
(4)

(Total for Question 8 is 4 marks)

- 9 Qasim simplifies $4(x^2 + 2x - 3) - 3(x^2 - x + 2)$

His working is shown below.

$$4x^2 + 8x - 12 - 3x^2 + 3x + 6$$

$$= x^2 + 11x - 6$$

His final expression is not correct.

Explain the mistake that Qasim has made.

(1)

(Total for Question 9 is 1 mark)

- 10 7 identical printing presses can print all the copies of a newspaper in 6 hours.

The newspaper wants all the copies printed in 4 hours 50 minutes.

All the presses work at the same rate.

Work out the least number of these printing presses needed.

.....

(2)

(Total for Question 10 is 2 marks)

- 11** The diagram shows a paper fan in the shape of a sector OAB of a circle, centre O .
The radius of the circle is 22 cm.
The perimeter of the fan is 81 cm.

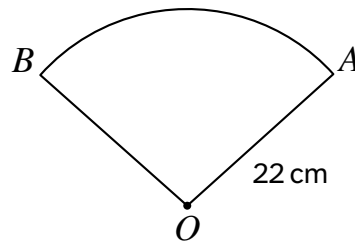


Diagram **NOT** accurately drawn

Work out the size of angle AOB .
Give your answer correct to 1 decimal place.

.....°
(3)

(Total for Question 11 is 3 marks)

12 Solve the simultaneous equations

$$4x - 3y = 20$$

$$6x + 5y = 11$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

(3)

(Total for Question 12 is 3 marks)

13 x and y are integers.

$$-4 < 3x + 2 < 20$$

$$4 < y \leq 7$$

$$x + 2y = 13$$

Work out all the possible values of x .

.....

(2)

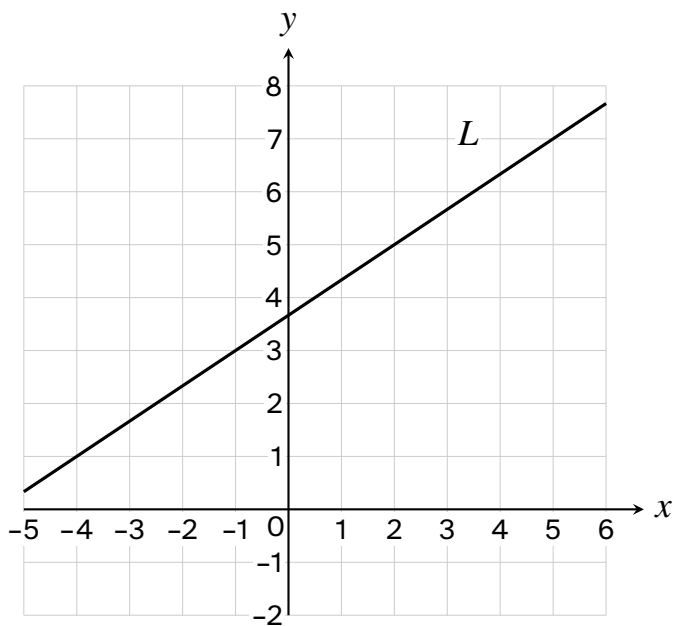
(Total for Question 13 is 2 marks)

14 Prove algebraically that $0.53\dot{6}$ can be written as $\frac{161}{300}$

(3)

(Total for Question 14 is 3 marks)

15 Line L is shown on the grid.



Work out an equation for L .

.....
(3)
(Total for Question 15 is 3 marks)

16 Make p the subject of the formula $m = \frac{\sqrt{p} + 5}{2\sqrt{p} - 3}$

$p = \dots\dots\dots$
(4)

(Total for Question 16 is 4 marks)

- 17** Chloe's grandmother invested some money in a savings bond for Chloe.
The bond paid 3.8% per year compound interest.
At the end of 3 years, the bond was worth £5368.26

Chloe says,

"The bond earned more than £575 in interest."

Is Chloe correct?

You must show all your working.

(4)

(Total for Question 17 is 4 marks)

- 18** The diagram shows a shade sail ABC in the shape of a triangle.

$$AB = 5.2 \text{ m} \quad \text{and} \quad AC = 6.3 \text{ m}$$

The perimeter of the shade sail is 16.9 m.

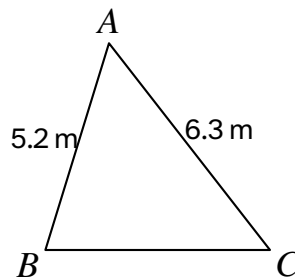


Diagram **NOT** accurately drawn

Work out the area of the shade sail.

Give your answer correct to 3 significant figures.

You must show all your working.

..... m^2
(4)

(Total for Question 18 is 4 marks)

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

AC is a diameter of the circle.

DCE is a straight line.

Angle $BCE = 64^\circ$

angle BAC : angle $CAD = 5:3$

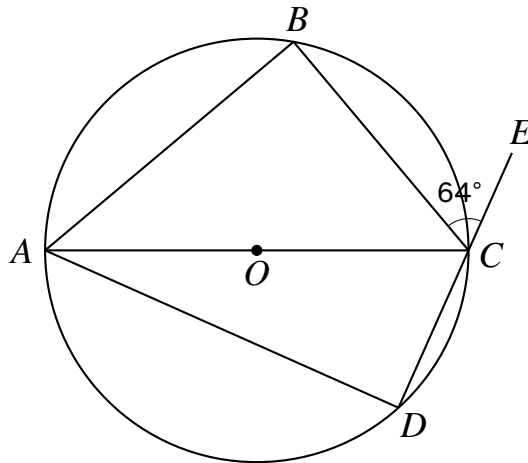


Diagram **NOT** accurately drawn

Work out the size of angle ACD .

Give a reason for each stage of your working.

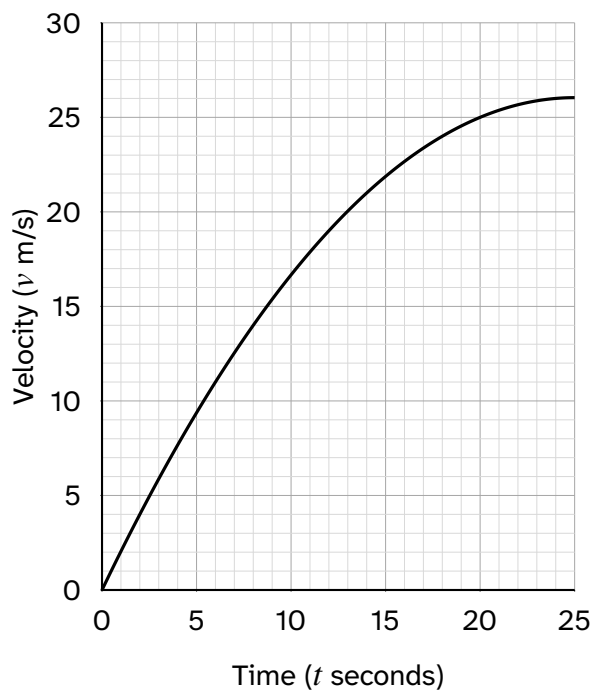
.....[°]
(4)

(Total for Question 19 is 4 marks)

20 Pedro rides a jet ski.

He starts from rest.

The graph shows his velocity, v metres per second, t seconds after he starts.



- (a) Use 3 strips of equal width to work out an estimate for the distance Pedro travels in the first 18 seconds.

..... m
(3)

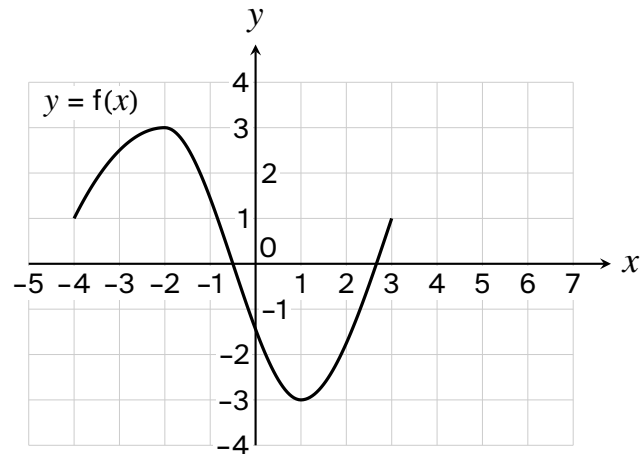
- (b) Is your answer to part (a) an underestimate or an overestimate of the actual distance?

Give a reason for your answer.

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

(Total for Question 20 is 4 marks)

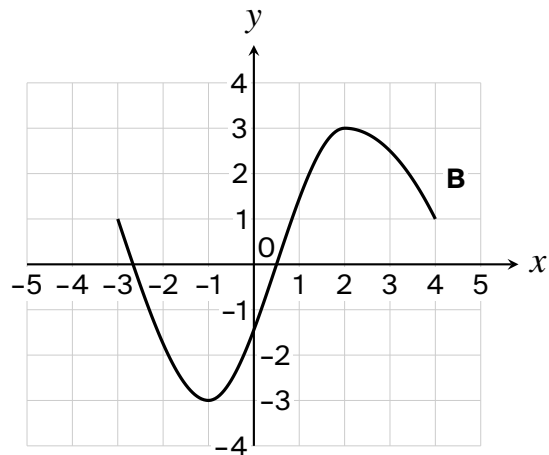
21 The grid shows the graph of $y = f(x)$.



(a) On the same grid, sketch the graph of $y = f(x - 3)$

(1)

(b) Graph **B**, shown on the grid below, is the image of the graph of $y = f(x)$ after a reflection.



Write down an equation of graph **B**.

.....

(1)

(Total for Question 21 is 2 marks)

22 $OABC$ is a trapezium.

$$\overrightarrow{OA} = 3\mathbf{a} \quad \overrightarrow{CB} = 2\mathbf{a} \quad \overrightarrow{OC} = 2\mathbf{b}$$

M is the point on OA such that $OM:MA = 2:1$

N is the point on AB such that $AN:NB = 1:2$

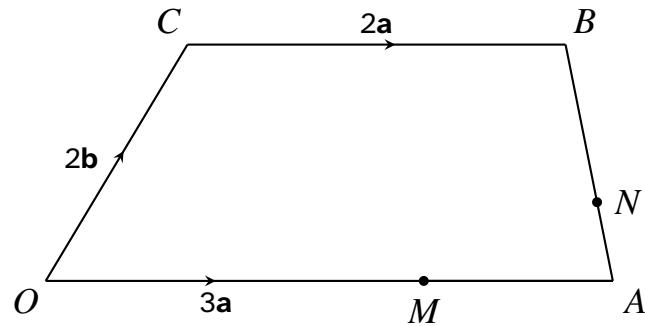


Diagram **NOT** accurately drawn

Use a vector method to prove that MN is parallel to OB .

(5)

(Total for Question 22 is 5 marks)

- 23** Prove algebraically that the product of any two consecutive even numbers is always 1 less than an odd square number.

(3)

(Total for Question 23 is 3 marks)

24 A florist has a bucket that contains only red tulips and yellow tulips.

There are 7 yellow tulips in the bucket.

Mohammed takes at random two tulips from the bucket.

The probability that the two tulips are the same colour is $\frac{7}{15}$

Work out the number of red tulips in the bucket.

You must show all your working.

.....
(5)

(Total for Question 24 is 5 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

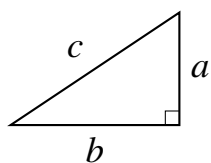
The solution of $ax^2 + bx + c = 0$ where $a \neq 0$:

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

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:

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

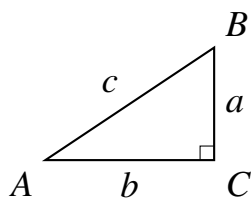


In any right-angled triangle ABC where a , b and c are the lengths of the sides and c is the hypotenuse:

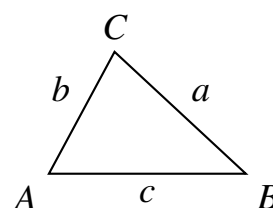
$$\sin A = \frac{a}{c}$$

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

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



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 :

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

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