

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 1 (Non-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 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 must not use a calculator.**

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 (a) Work out $4\frac{1}{6} - 1\frac{3}{4}$

Give your answer as a mixed number.

.....
(2)

(b) Show that $2\frac{5}{8} \div 1\frac{2}{5} = 1\frac{7}{8}$

(2)
(Total for Question 1 is 4 marks)

2 Write 980 as a product of powers of its prime factors.

.....

(2)

(Total for Question 2 is 2 marks)

3 Here are the first five terms of an arithmetic sequence.

47 41 35 29 23

(a) Find an expression, in terms of n , for the n th term of this sequence.

.....
(2)

(b) Musa says that -100 is a term in this sequence.

Is Musa correct?

You must give a reason for your answer.

(1)

(Total for Question 3 is 3 marks)

- 4** Malik makes a biased four-sided spinner for a game at a school fair.

The spinner can land on A, B, C or D.

The table shows the probabilities that the spinner will land on A and on B.

Letter	A	B	C	D
Probability	0.3	0.25		

The probability that the spinner will land on C is four times the probability that it will land on D.

- (a) Work out the probability that the spinner will land on D.

.....
(2)

- (b) Malik spins the spinner 200 times.

Work out an estimate for how many more times the spinner will land on C than on D.

.....
(2)

(Total for Question 4 is 4 marks)

- 5 Darius is making flapjacks for a cricket club tea.
Here is the list of ingredients for making 15 flapjacks.

Flapjacks (makes 15)
225 g rolled oats
150 g butter
90 g brown sugar
105 g golden syrup

Darius has 0.9 kg of rolled oats, 650 g of butter, 450 g of brown sugar and 500 g of golden syrup.

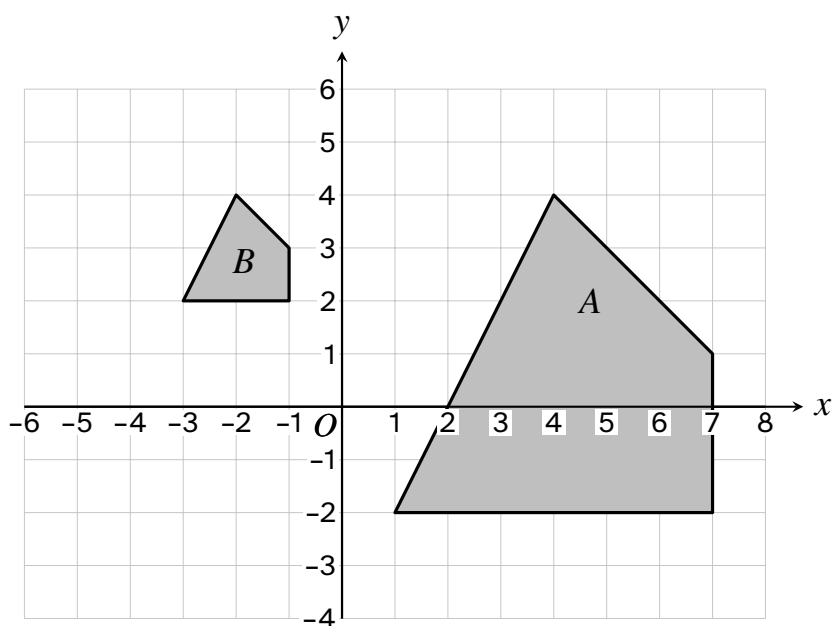
Work out the greatest number of flapjacks that Darius can make.

You must show all your working.

.....
(3)

(Total for Question 5 is 3 marks)

- 6 Shapes A and B are drawn on the grid.



Describe fully the single transformation that maps shape A onto shape B .

(2)

(Total for Question 6 is 2 marks)

7 Erin buys a craft kit.

The kit has only red beads, white beads and blue beads.

number of red beads : number of white beads = 4:9

number of red beads : number of blue beads = 6:5

- (a) Find the ratio number of red beads : number of white beads : number of blue beads

.....
(2)

- (b) In one craft kit there are 85 more white beads than blue beads.

Work out the total number of beads in this craft kit.

.....
(3)
(Total for Question 7 is 5 marks)

8 PEQ and $RFGS$ are parallel straight lines.

EFG is a triangle.

All angles are measured in degrees.

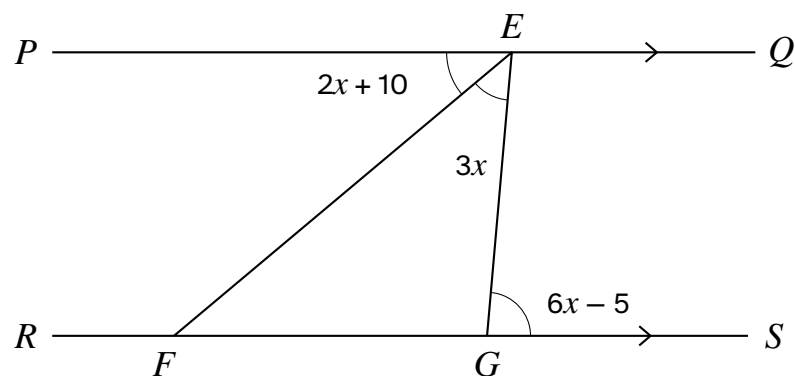


Diagram **NOT** accurately drawn

Work out the size of angle EGF .

You must give a reason for each stage of your working.

.....^o
(4)

(Total for Question 8 is 4 marks)

- 9 A bookcase stands on the horizontal floor of a library.
The base of the bookcase is a rectangle 1.1 m by 40 cm.
The bookcase exerts a force of 924 newtons on the floor.

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

Work out the pressure on the floor due to the bookcase.

Give your answer in newtons/m²

..... newtons/m²
(3)

(Total for Question 9 is 3 marks)

10 Leah grows 12 pumpkins.

The mean mass of the 12 pumpkins is 4.5 kg.

The mean mass of the 4 heaviest pumpkins is 7.2 kg.

Leah says,

“The mean mass of the other 8 pumpkins is less than 3 kg.”

Is Leah correct?

You must show how you get your answer.

(3)

(Total for Question 10 is 3 marks)

11 Gemma buys a bike in a sale.

All the prices in the sale are 35% less than the normal prices.

Gemma pays £286 for the bike.

Work out the normal price of the bike.

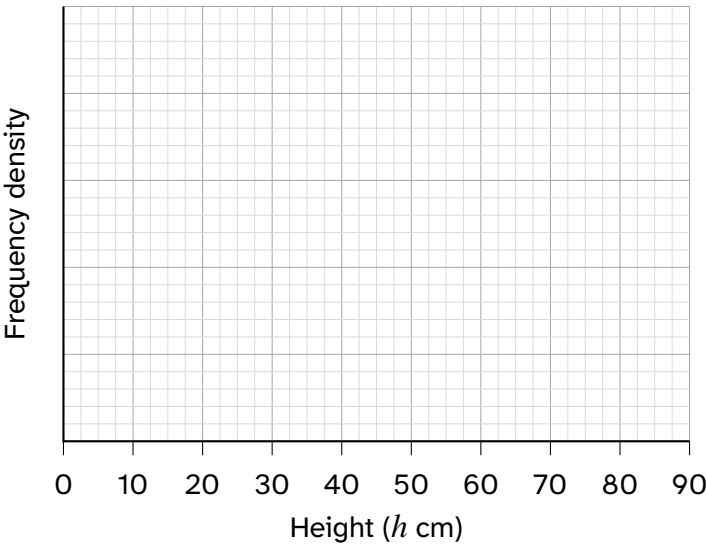
£
(2)

(Total for Question 11 is 2 marks)

12 The table gives information about the heights, h cm, of 120 saplings in a tree nursery.

Height (h cm)	Frequency
$0 < h \leq 10$	12
$10 < h \leq 25$	30
$25 < h \leq 40$	36
$40 < h \leq 70$	30
$70 < h \leq 90$	12

(a) On the grid, draw a histogram for the information in the table.



(3)

(b) Work out an estimate for the number of saplings with a height between 30 cm and 60 cm.

.....
(2)

(Total for Question 12 is 5 marks)

- 13** (a) Write down the value of $\left(\frac{2}{3}\right)^{-1}$

.....
(1)

- (b) Work out the value of $81^{-\frac{3}{4}}$

.....
(2)

(Total for Question 13 is 3 marks)

- 14** 14 members of a badminton club take part in a competition.
Each member plays each of the other members exactly once.

Sean says,

“There will be 182 games in the competition.”

Is Sean correct?

You must give a reason for your answer.

(2)

(Total for Question 14 is 2 marks)

15 (a) Factorise $5x^2 + 13x - 6$

.....
(2)

(b) Hence, solve $5x^2 + 13x - 6 > 0$

.....
(2)

(Total for Question 15 is 4 marks)

16 For $x > 0$, the functions f and g are such that

$$f(x) = \frac{18}{x+3} \qquad g(x) = 4x - 1$$

(a) Work out $gf(6)$

.....
(2)

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

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

(Total for Question 16 is 4 marks)

17 A solid cylinder has radius 4 cm and height 9 cm.

A solid hemisphere has the same volume as the cylinder.

Volume of a sphere = $\frac{4}{3}\pi r^3$ Surface area of a sphere = $4\pi r^2$
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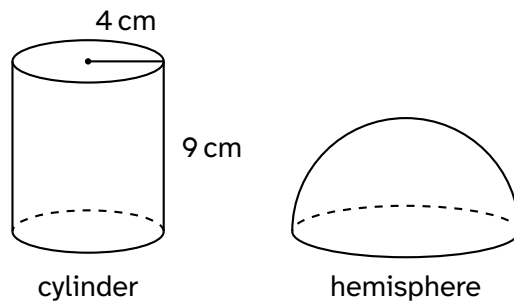


Diagram **NOT** accurately drawn

Work out the total surface area of the hemisphere.

Give your answer in terms of π .

You must show all your working.

..... cm²
(4)

(Total for Question 17 is 4 marks)

- 18** AB is parallel to DE .
 ACE and BCD are straight lines.

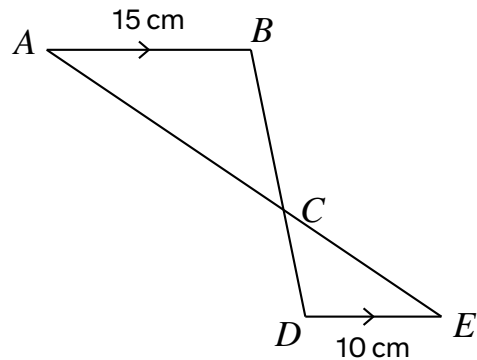


Diagram **NOT** accurately drawn

- (a) Prove that triangle ABC is similar to triangle EDC .

(2)

- (b) $BD = 20\text{ cm}$ $AE = 35\text{ cm}$

Work out the perimeter of triangle CDE .
You must show all your working.

..... cm
(3)
(Total for Question 18 is 5 marks)

- 19** (a) Show that $(2\sqrt{3} - 1)^2$ can be written in the form $a + b\sqrt{3}$, where a and b are integers.

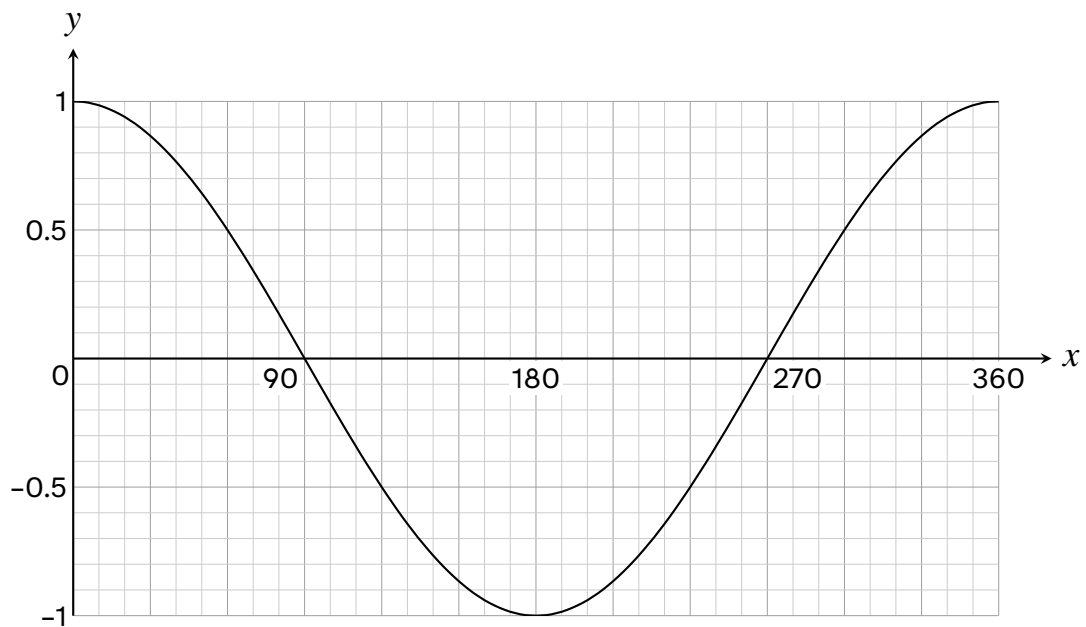
(2)

- (b) Write $\sqrt{63} + \sqrt{28}$ in the form $k\sqrt{7}$, where k is an integer.

.....
(2)

(Total for Question 19 is 4 marks)

20 Here is the graph of $y = \cos x^\circ$ for $0 \leq x \leq 360$



(a) Heidi says,

“ $\cos 100^\circ$ is greater than $\cos 260^\circ$ ”

Is Heidi correct?

Give a reason for your answer.

(1)

(b) Use the graph to find estimates of the solutions of $5 \cos x^\circ + 3 = 0$ for $0 \leq x \leq 360$

.....
(2)

(Total for Question 20 is 3 marks)

21 Here are the first three terms of a sequence.

$$1 + \sqrt{2}$$

$$1 + 2\sqrt{2}$$

$$-1 + 5\sqrt{2}$$

Show that this is a geometric sequence.

(3)

(Total for Question 21 is 3 marks)

22 The diagram shows triangle ABC .

D is the point on BC such that AD is perpendicular to BC .

$AB = 8\text{ cm}$ angle $ABC = 60^\circ$ angle $ACB = 45^\circ$

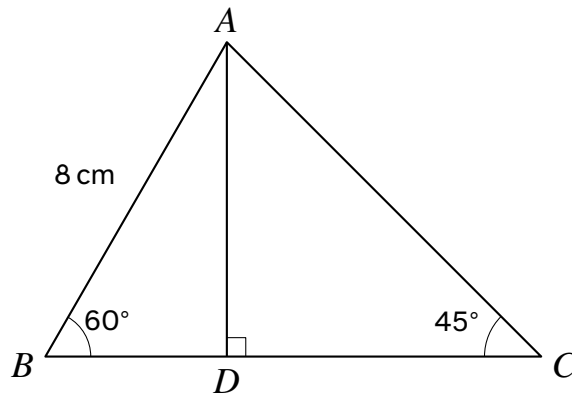


Diagram **NOT** accurately drawn

Show that the length of BC can be written as $4(1 + \sqrt{3})\text{ cm}$

(3)

(Total for Question 22 is 3 marks)

23 The circle **C** has equation $x^2 + y^2 = 130$

The line **L** has equation $x - 2y = 5$

L intersects **C** at the points *A* and *B*.

O is the origin.

Work out the area of triangle *OAB*.

You must show all your working.

.....

(5)

(Total for Question 23 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

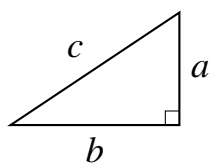
The solution of
 $ax^2 + bx + c = 0$
where $a \neq 0$:

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

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:

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

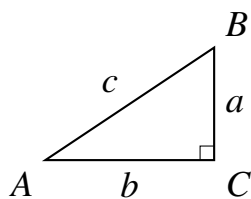


In any right-angled triangle ABC where a , b and c are the lengths of the sides and c is the hypotenuse:

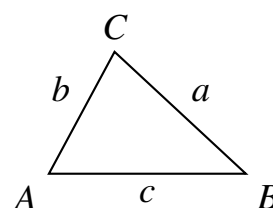
$$\sin A = \frac{a}{c}$$

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

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



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 :

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

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