

Teach Me Maths

Please write clearly in block capitals.

Name _____

Date _____

GCSE MATHEMATICS

H

Higher Tier • Paper 1 (Non-Calculator)

Mock Set B

For AQA GCSE Mathematics (8300)

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- mathematical instruments
- the Formulae Sheet (the last page of this paper).

You must **not** use a calculator.

For the marker
TOTAL (out of 80)

Instructions

- Write in black ink or black ball-point pen. Use a pencil for diagrams.
- Write your name and the date at the top of this page.
- Answer **all** questions.
- Write your answers in the spaces provided. If you need more room, use extra paper and write the question number next to your answer.
- Do all your rough work on this paper. Cross out any work you do not want to be marked.

Information

- The marks for each question are shown in brackets.
- The maximum mark for this paper is 80.
- You may use extra answer paper, graph paper and tracing paper.

Advice

In every calculation, show clearly how you get your answer.

Practice paper written by Teach Me Maths in the style of AQA GCSE Mathematics (8300). Not an official AQA paper.

Answer **all** questions in the spaces provided.

1 Work out $\sqrt{0.0036}$

Circle your answer.

[1 mark]

0.0018

0.006

0.06

0.6

2 By rounding each number to 1 significant figure, estimate the value of

$$\frac{8.17 \times 0.287}{0.0503}$$

You must show your working.

[2 marks]

Answer _____

3 The prize money for a quiz is shared between the teams that finish first, second and third.

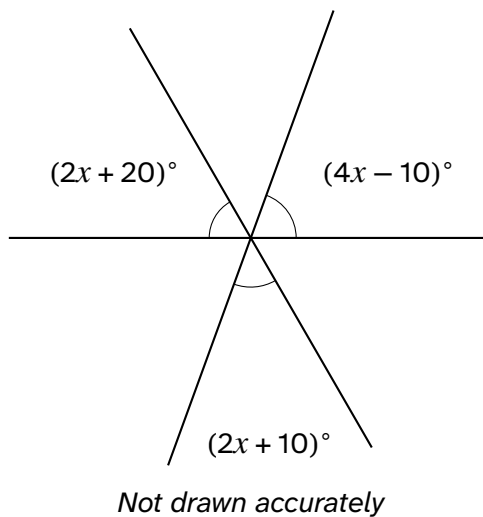
- The team that finishes first gets $\frac{2}{5}$ of the prize money.
- The teams that finish second and third share the rest in the ratio 7:5
- The team that finishes second gets £40 more than the team that finishes third.

Work out the total prize money.

[3 marks]

Answer £ _____

- 4 Three straight lines meet at a point.



Work out the size of the largest angle in the diagram.

[3 marks]

Answer _____ degrees

- 5** Sana tries to solve the equation $6(2x - 3) = 4(x - 5) + 7$

Here is her working.

$$12x - 3 = 4x - 20 + 7$$

$$12x - 3 = 4x - 13$$

$$8x = -10$$

$$x = -1.25$$

- (a) What mistake has Sana made?

[1 mark]

- (b) Solve $6(2x - 3) = 4(x - 5) + 7$

[2 marks]

$x =$ _____

6 $\xi = \{\text{integers from 1 to 20}\}$

$A = \{\text{multiples of 4}\}$

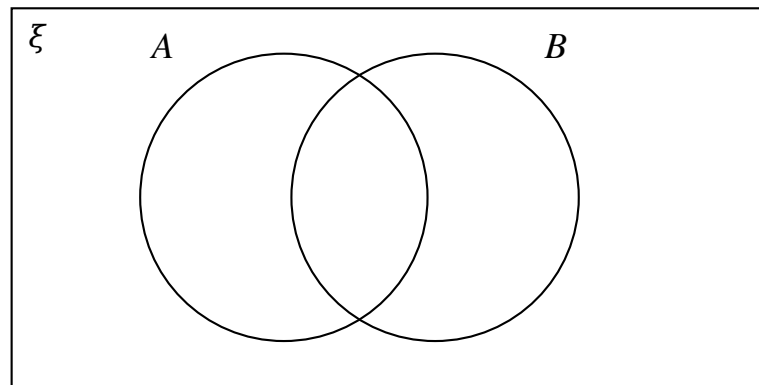
$B = \{\text{factors of 40}\}$

(a) List the members of $A \cap B$

[1 mark]

Answer _____

(b) Complete the Venn diagram.



[2 marks]

(c) A number is chosen at random from ξ .

Work out $P(A' \cap B)$

[1 mark]

Answer _____

7 On Saturday at a summer festival,

- $\frac{1}{4}$ of the visitors buy food from the pizza stall
- $\frac{2}{9}$ of the other visitors buy food from the noodle stall
- the remaining 1400 visitors do not buy food from either stall.

No visitor buys food from both stalls.

How many visitors were at the festival on Saturday?

[3 marks]

Answer _____

8 Deepa catches a train from Leeds to London.

- The train leaves Leeds at 10:30
- It travels 306 km at an average speed of 136 km/h.
- From the station in London, it takes Deepa 12 minutes to get to a meeting.
- The meeting starts at 13:00

Deepa says,

“I will get to my meeting on time.”

Is Deepa correct?

You must show your working.

[3 marks]

☐ Yes

☐ No

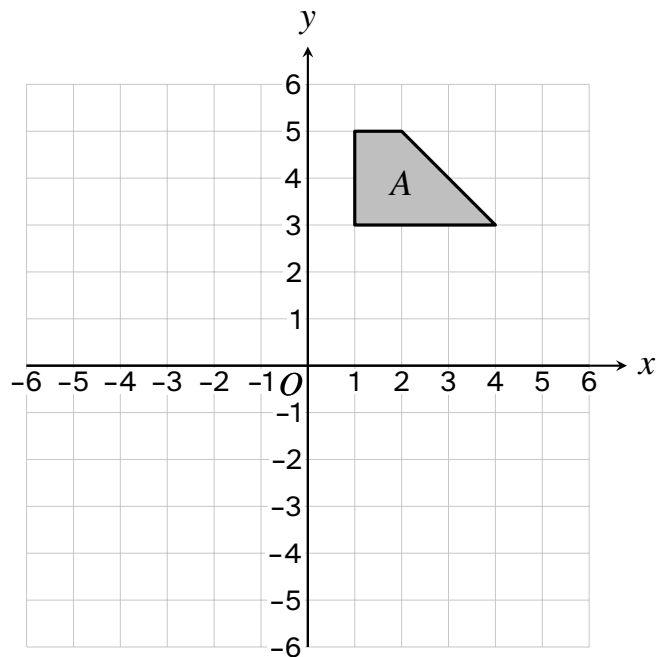
9 Write $0.\dot{8}\dot{4}$ as a fraction in its simplest form.

[3 marks]

Answer _____

10 Shape A is drawn on the grid.

- (a) Reflect shape A in the line $y = -x$
Label your image B .



[2 marks]

- (b) Shape B is rotated 90° clockwise about $(0, 0)$ to give shape C .

Describe fully the **single** transformation that maps shape A onto shape C .

[2 marks]

11 Solve the simultaneous equations

$$4x + 3y = 7$$

$$6x - 5y = 39$$

You must show your working.

[3 marks]

$x =$ _____ $y =$ _____

12 Here are the first three terms of a geometric progression.

$$2\sqrt{5} \qquad 10 \qquad 10\sqrt{5}$$

(a) Work out the next term of the sequence.

[1 mark]

Answer _____

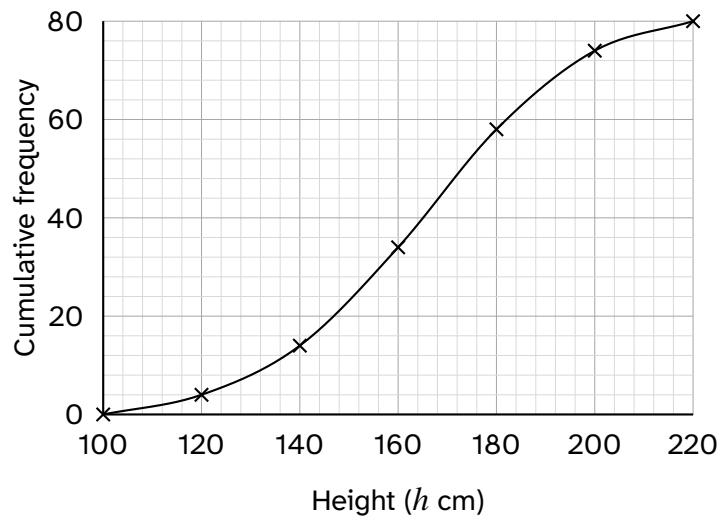
(b) Which term of the sequence is equal to 1250?

You must show your working.

[2 marks]

Answer _____

- 13 A gardening club grows 80 sunflowers in compost P and 80 sunflowers in compost Q . The cumulative frequency graph shows information about the heights of the sunflowers grown in compost P .



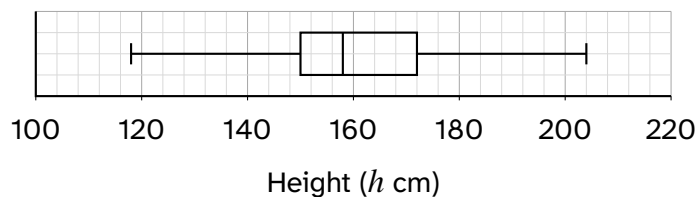
- (a) Use the graph to estimate the median and the inter-quartile range of the heights of the sunflowers grown in compost P .

[2 marks]

Median _____ cm

Inter-quartile range _____ cm

- (b) The box plot shows information about the heights of the sunflowers grown in compost Q .



Make **two** comparisons between the heights of the sunflowers grown in compost P and the heights of the sunflowers grown in compost Q .

[2 marks]

- 14** Prove that $(2n + 5)^2 - (2n - 1)^2$ is a multiple of 24 for all positive integers n .
[3 marks]

- 15** A crate at a farm shop contains red apples and green apples only.

number of red apples : number of green apples = 3:2

40 green apples are added to the crate.

Now

number of red apples : number of green apples = 5:6

How many apples were in the crate at first?

[3 marks]

Answer _____

- 16** (a) Expand and simplify $(6 + \sqrt{2})(3 - \sqrt{2})$

Give your answer in the form $p + q\sqrt{2}$ where p and q are integers.

[2 marks]

Answer _____

- (b) $\sqrt{a} + \sqrt{50} = 9\sqrt{2}$ where a is an integer.

Work out the value of a .

[2 marks]

$a =$ _____

- 17** (a) Factorise $x^2 - 3x - 28$

[1 mark]

Answer _____

- (b) Hence, solve $x^2 - 3x - 28 > 0$

[2 marks]

Answer _____

18 (a) Work out the value of $7^0 + 1000^{\frac{2}{3}}$

[1 mark]

Answer _____

(b) $\frac{\sqrt{5}}{25} = 5^n$

Work out the value of n .

[2 marks]

$n =$ _____

19 t is inversely proportional to the square root of n .

When $n = 36$, $t = 10$

(a) Work out the value of n when $t = 15$

[2 marks]

$n =$ _____

(b) Mason says,

“When n is multiplied by 9, t is divided by 3”

Is Mason correct?

Tick a box.

Give a reason for your answer.

[1 mark]

☐

Yes

☐

No

20 Simplify fully $\frac{9x^2 - 49}{3x^2 - x - 14}$

[3 marks]

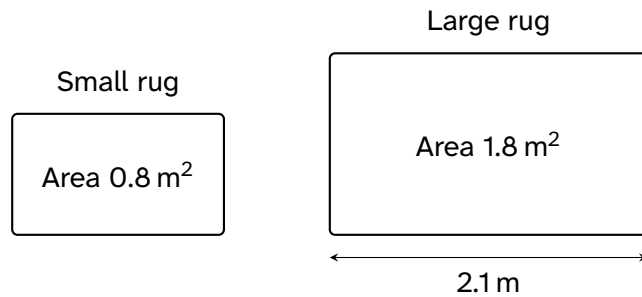
Answer _____

21 A shop sells a small rug and a large rug.

The rugs are mathematically similar.

The small rug has area 0.8 m^2

The large rug has area 1.8 m^2 and length 2.1 m .



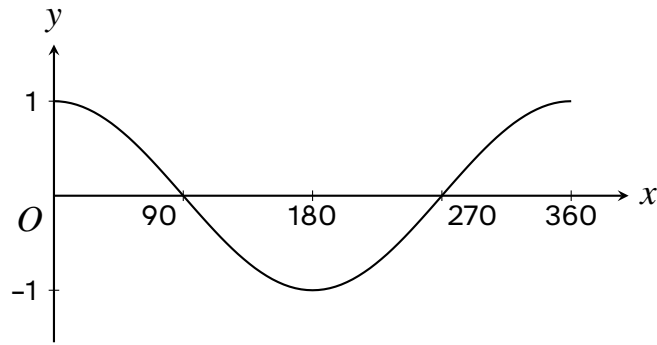
Not drawn accurately

Work out the length of the small rug.

[3 marks]

Answer _____ m

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



(a) Write down the coordinates of the minimum point of the graph.

[1 mark]

Answer (_____ , _____)

(b) $\cos 72.54^\circ = 0.3$

Use this fact and the graph to solve $\cos x = -0.3$ for $0^\circ \leq x \leq 360^\circ$

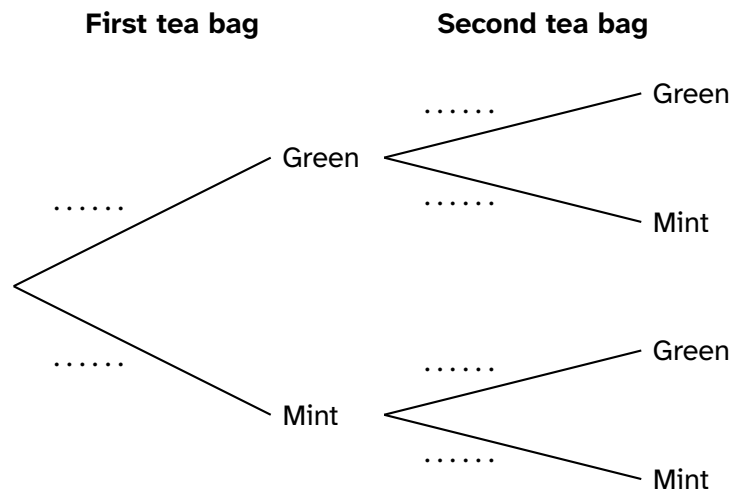
[2 marks]

Answer _____ ° and _____ °

23 A box contains 8 green tea bags and 4 mint tea bags only.

Mei takes two tea bags at random from the box without replacement.

(a) Complete the tree diagram.



[2 marks]

(b) Mei says,

“I am more likely to take two tea bags of the same flavour than two tea bags of different flavours.”

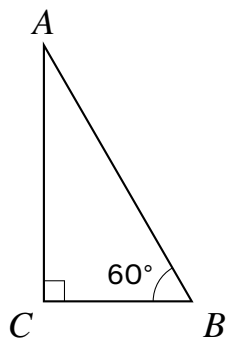
Is Mei correct?

You must show your working.

[3 marks]

☐ Yes ☐ No

24 ABC is a right-angled triangle.



Not drawn accurately

The area of triangle ABC is $24\sqrt{3} \text{ cm}^2$

Work out the length of BC .

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

You must show your working.

[3 marks]

Answer _____ cm

25 The circle $x^2 + y^2 = 42$ and the line $x - y = 6$ intersect at two points.

Work out the exact coordinates of the two points.

Give your answers in their simplest form.

You must show your working.

[5 marks]

Answer (_____ , _____)

and (_____ , _____) _____

END OF QUESTIONS

Formulae Sheet

For AQA GCSE Mathematics (8300) • 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:

$$\sin A = \frac{a}{c} \quad \cos A = \frac{b}{c} \quad \tan A = \frac{a}{b}$$

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 :

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

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