

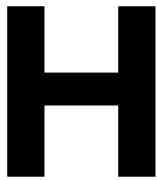
Teach Me Maths

Please write clearly in block capitals.

Name _____

Date _____

GCSE MATHEMATICS



Higher Tier • Paper 3 (Calculator)

Mock Set A

For AQA GCSE Mathematics (8300)

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

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

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.

For the marker

TOTAL (out of 80)

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** Dafydd is planning a walk in the Peak District.

The route he wants to walk is 14.6 cm long on his map.

The scale of the map is 1:25 000

Work out the real length of the route.

Give your answer in kilometres.

[2 marks]

Answer _____ km

- 2** Here are the first four terms of a linear sequence.

23 19 15 11

Which expression is the n th term of the sequence?

Circle your answer.

[1 mark]

$23 - 4n$

$4n + 27$

$27 - 4n$

$19 - 4n$

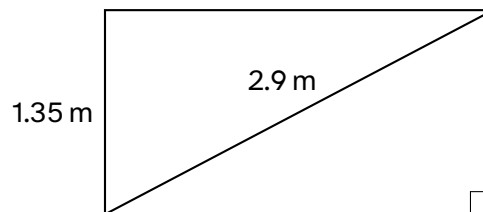
- 3 The length of a ribbon is l cm.
 l is **truncated** to 1 decimal place.
The result is 46.3 cm.

Complete the error interval for l .

[2 marks]

Answer _____ $\leq l <$ _____

- 4 The diagram shows a rectangular gate with a diagonal brace.



Not drawn accurately

Work out the perimeter of the gate.

[3 marks]

Answer _____ m

- 5 Bethan buys dog biscuits for her dog.

Dog biscuits are sold in three sizes of bag.

Small bag	Medium bag	Large bag
2 kg	3 kg	5 kg
£5.80	£8.40	£11.90
	Now 20% extra free	

Which bag is the best value for money?

You must show your working.

[3 marks]

Answer _____

6 A cricket club orders new shirts.

- each of the first 12 shirts costs £16
- each shirt after the first 12 costs 25% less
- there is a delivery charge of £8.50 for the whole order.

The club pays £368.50 in total.

How many shirts did the club order?

[3 marks]

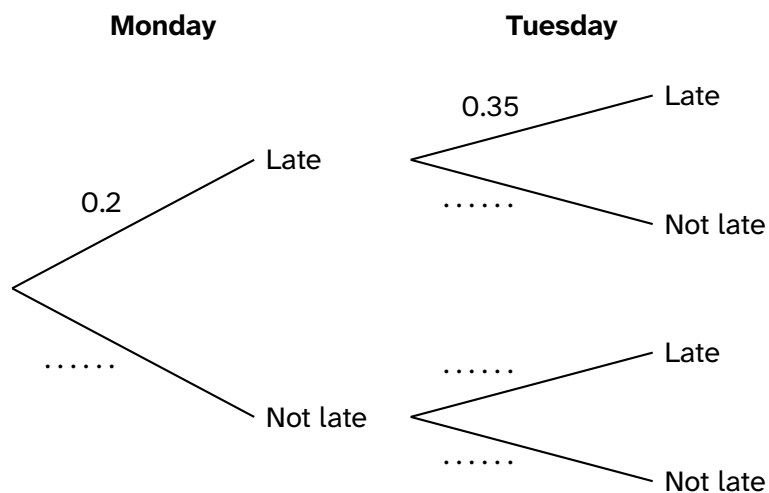
Answer _____

7 Sami catches a bus to school on Monday and on Tuesday.

- The probability that the bus is late on Monday is 0.2
- The probability that the bus is late on Tuesday is 0.35

Whether the bus is late on Tuesday is independent of whether it is late on Monday.

(a) Complete the tree diagram.



[2 marks]

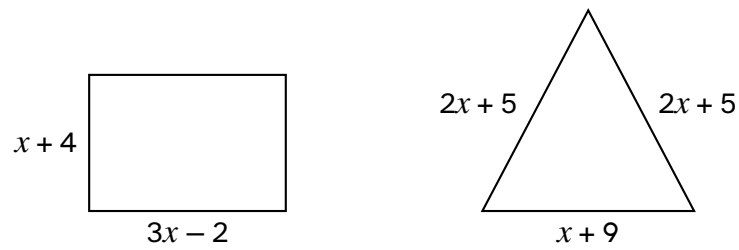
(b) Work out the probability that the bus is late on at least one of the two mornings.

[2 marks]

Answer _____

- 8 Here are a rectangle and an isosceles triangle.

All measurements are in centimetres.



Not drawn accurately

The rectangle and the triangle have the same perimeter.

Work out the length of the side $x + 9$ of the triangle.

[3 marks]

Answer _____ cm

9 Zara rides her horse from her stables to a village and back.

- On the way to the village she rides 16.8 km at an average speed of 12 km/h.
- On the way back she takes a shorter route of 12 km. This takes her 45 minutes.

Zara says,

‘My average speed for the whole ride was more than 13.5 km/h.’

Is Zara correct?

Tick a box.

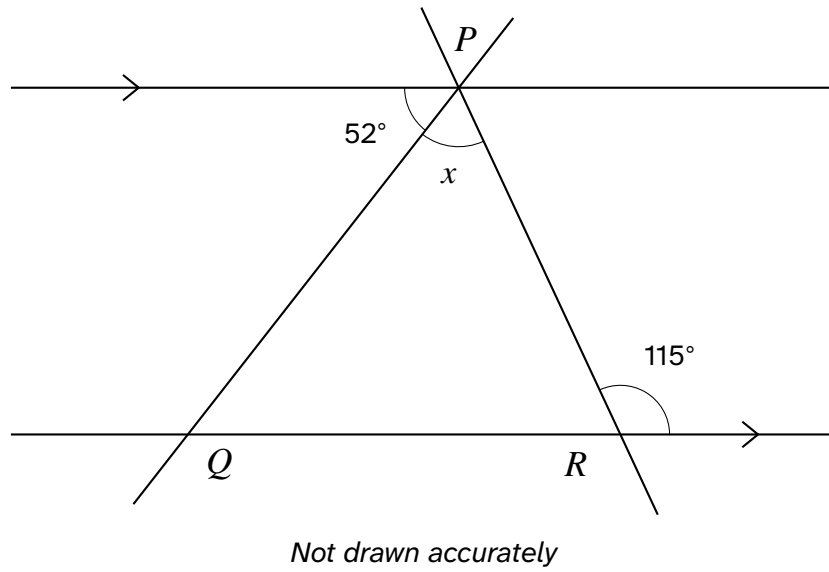
You must show your working.

[4 marks]

☐ Yes

☐ No

- 10** The diagram shows two parallel lines and two straight lines that meet on the upper parallel line.



Show that $x = 63^\circ$

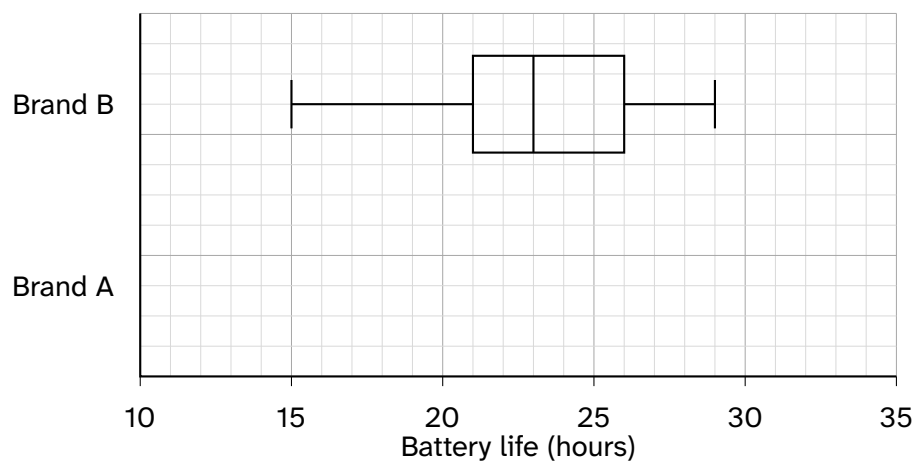
[3 marks]

- 11** Kemi tests the battery life of 60 pairs of Brand *A* headphones and 60 pairs of Brand *B* headphones.

Information about Brand *A* is shown in the table.

Shortest battery life	12 hours
Lower quartile	17 hours
Median	21 hours
Upper quartile	25 hours
Longest battery life	31 hours

The box plot for Brand *B* is drawn on the grid.



- (a) On the grid, draw a box plot for Brand *A*.

[2 marks]

- (b) Compare the battery lives of the two brands.

Give **two** comparisons.

[2 marks]

12 Each flat in a block has a door entry code.

Each code is **two** letters followed by **four** digits.

- The letters are chosen from A, B, C, D, E, F
- The digits are chosen from 0 to 9

Letters and digits can be repeated.

(a) Work out the number of different codes possible.

[1 mark]

Answer _____

(b) New rules are brought in.

- The two letters must be different.
- The last digit must be odd.

Jack says,

‘The new rules halve the number of different codes possible.’

Is Jack correct?

Tick a box.

You must show your working.

[2 marks]

☐ Yes

☐ No

13 Owen has a water butt in his garden.

- When full, the water butt holds 0.35 m^3 of water.
- The water butt already contains 80 litres of water.
- Water flows into the water butt at a constant rate of 3.6 litres per minute.

$$1 \text{ m}^3 = 1000 \text{ litres}$$

Owen starts filling the water butt at 10:50 am.

Will the water butt be full by 12 noon?

You must show your working.

[3 marks]

Answer _____

14 Ali is solving $3x^2 - 7x - 20 = 0$

Here is his working.

$$3x^2 - 7x - 20 = 0$$

$$(3x - 5)(x + 4) = 0$$

$$x = \frac{5}{3} \text{ or } x = -4$$

(a) Show that Ali's factorisation is wrong.

[1 mark]

(b) Solve $3x^2 - 7x - 20 = 0$

[2 marks]

Answer _____

15 (a) Isla writes

$$5^4 \times 5^{-7} = 25^{-3}$$

What mistake has Isla made?

[1 mark]

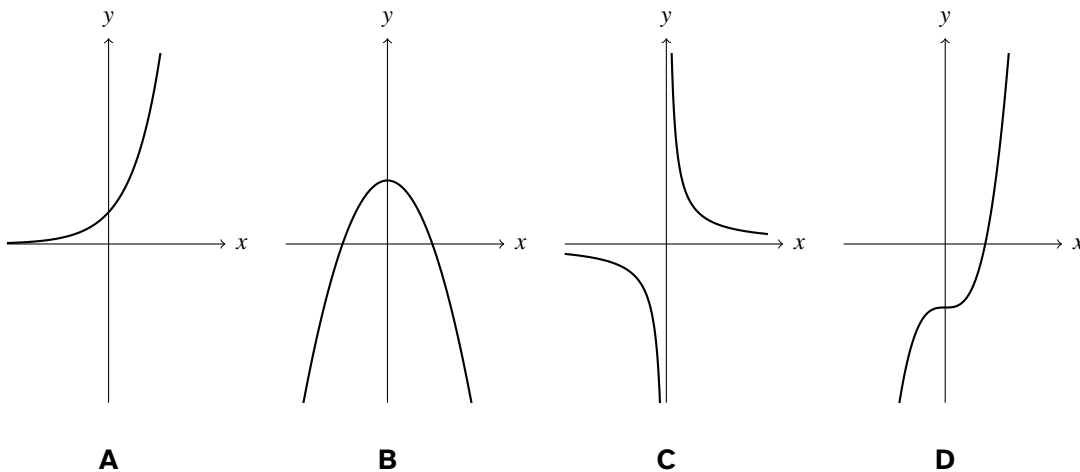
(b) $\frac{6^5 \times 10^3}{15^2} = 2^a \times 3^b \times 5^c$

Work out the values of a , b and c .

[2 marks]

$a =$ _____ $b =$ _____ $c =$ _____

16 Here are four sketch graphs.



Write down the letter of the graph that could have each equation.

(a) $y = x^3 - 2$

[1 mark]

Answer _____

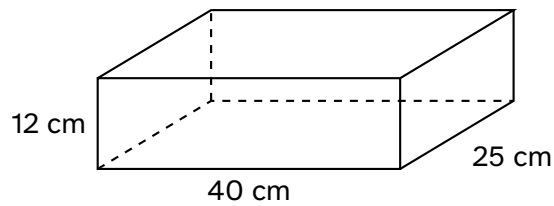
(b) $y = 3^x$

[1 mark]

Answer _____

- 17 A concrete block is a cuboid.

The block exerts a force of 150 newtons on the ground.



Not drawn accurately

The block can rest on any of its faces on horizontal ground.

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

Work out the greatest pressure the block can exert on the ground.

Give your answer in newtons/m²

[3 marks]

Answer _____ newtons/m²

18 A is the point $(-1, 8)$

B is the point $(7, 2)$

Line L is perpendicular to AB and passes through the midpoint of AB .

Work out the equation of line L .

Give your answer in the form $y = mx + c$

[4 marks]

Answer _____

19 Here are the first five terms of a quadratic sequence.

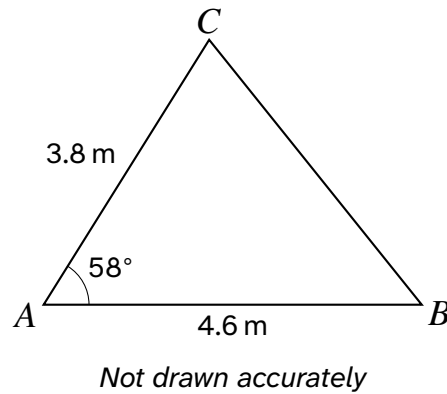
5 9 19 35 57

Work out an expression for the n th term.

[3 marks]

Answer _____

- 20** The diagram shows a triangular patio ABC .



- (a) Work out the length BC .

Give your answer to 3 significant figures.

[3 marks]

Answer _____ m

- (b) Megan is going to cover the patio with sealant.

One tin of sealant covers 2.4 m^2

Megan has 3 tins of sealant.

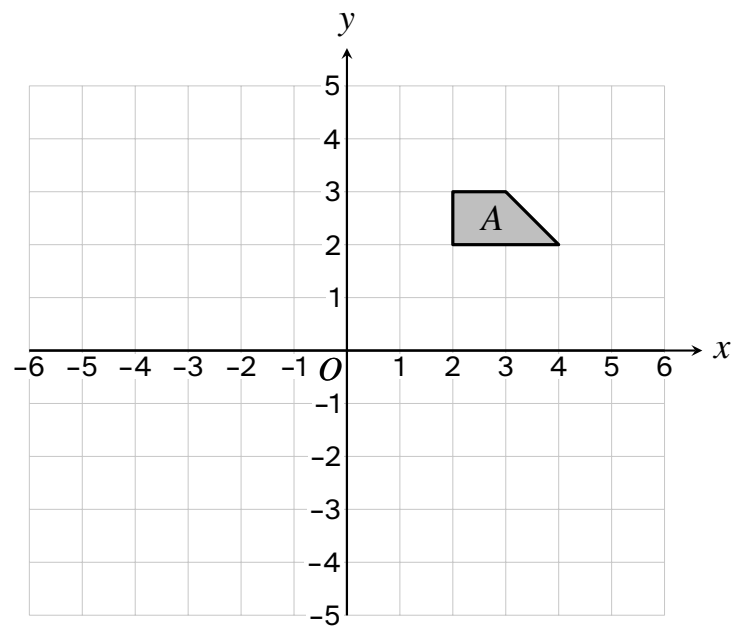
Does Megan have enough sealant?

You must show your working.

[2 marks]

Answer _____

- 21** Enlarge shape A by scale factor -2 , centre $(1, 1)$



[2 marks]

- 22** The ratio of fiction books to non-fiction books on a classroom shelf is $7:4$

Mrs Hughes takes 8 fiction books off the shelf.

She puts 4 more non-fiction books on the shelf.

The ratio of fiction books to non-fiction books is now $4:3$

How many fiction books were on the shelf at the start?

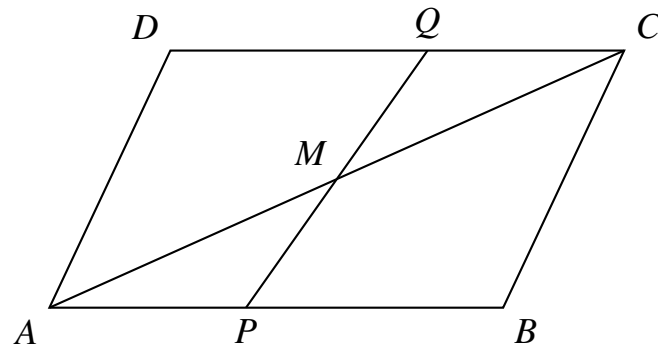
[4 marks]

Answer _____

23 $ABCD$ is a parallelogram.

M is the midpoint of the diagonal AC .

PMQ is a straight line with P on AB and Q on DC .



Not drawn accurately

Prove that triangle AMP is congruent to triangle CMQ .

[4 marks]

- 24** The straight line $x + y = 4$ meets the curve $y = 2x^2 + x - 8$ at the points A and B .

Work out the length AB .

Give your answer to 3 significant figures.

Do **not** use trial and improvement.

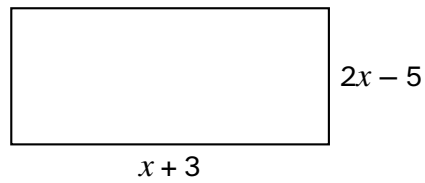
You must show your working.

[5 marks]

Answer _____

25 Here is a rectangle.

All measurements are in centimetres.



Not drawn accurately

The area of the rectangle is less than 30 cm^2

Work out the range of possible values of x .

You must show your working.

[4 marks]

Answer _____

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 :

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

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