

GCSE Mathematics (1MA1) – Aiming for Grade 7 1H

Student-friendly mark scheme

Please note that this mark scheme is not the one used by examiners for marking scripts. It is intended more as a guide to good practice, indicating where marks are given for correct answers. As such, it doesn't show follow-through marks (marks that are awarded despite errors being made) or special cases.

It should also be noted that for many questions, there may be alternative methods of finding correct solutions that are not shown here – they will be covered in the formal mark scheme.

Some questions require all working to be shown; in such questions, no marks will be given for an answer with no working (even if it is a correct answer).

The following table shows the marks scored on average at certain grades on similar questions from live exams.

For example: A student who achieved a Grade 7 on similar questions from either the Summer 2023 or November 2023 exam sittings achieved on average 26.3 marks from these questions.

Grade	9	8	7	6	5	4	3
Mark	33.5	30.6	26.3	20.0	13.3	7.1	3.0

Answer all questions.
Write your answers in the spaces provided.
You must write down all the stages in your working.

- 1 The normal price of a mattress is reduced by 40% in a sale.
 The price of the mattress in the sale is £660
 Work out the normal price of the mattress.

$$\begin{array}{lcl}
 60\% & = & 660 \\
 \div 60 & & \div 60 \\
 \hline
 1\% & = & £11 \\
 \times 100 & & \times 100 \\
 \hline
 100\% & = & £1100
 \end{array}$$

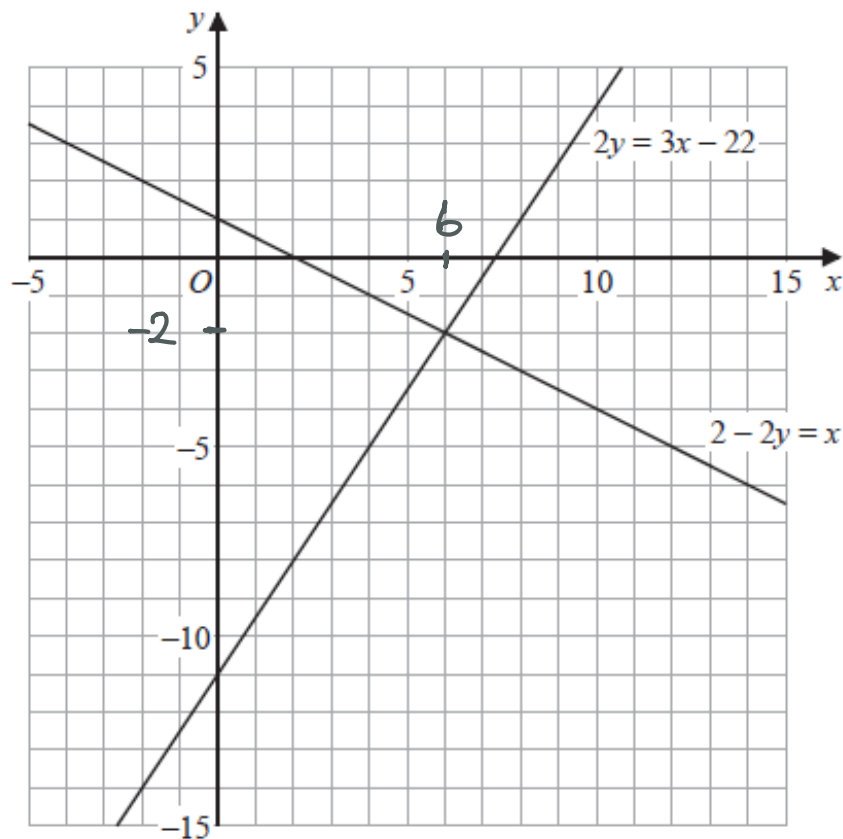
1 mark

$$\begin{array}{c}
 100\% \\
 \boxed{60\%} \quad \boxed{40\%} \\
 \hline
 660
 \end{array}$$

£ 1100 Final mark

(Total for Question 1 is 2 marks)

*2



Use these graphs to solve the simultaneous equations

$$\begin{array}{l}
 2 - 2y = x \\
 2y = 3x - 22
 \end{array}$$

x = 6 1 mark

y = -2

(Total for Question 2 is 1 mark)

- 3 Write $\frac{(6x^5y^3)^2}{3x^2y^7 \times 4xy^{-3}}$ in the form ax^by^c where a , b and c are integers.

$$(6x^5y^3)^2 = 6x^5y^3 \times 6x^5y^3 = 36x^{10}y^6$$

$$3 \times 4 \times x^2 \times x \times y^7 \times y^{-3} = 12x^3y^4$$

1 mark for either of these with at least two of three terms correct

so: $\frac{36x^{10}y^6}{12x^3y^4}$ 1 mark

$$3x^7y^2$$
 Final mark

(Total for Question 3 is 3 marks)

- 4 (a) Write $\frac{1}{16}$ in the form 4^n where n is an integer.

$$16 = 4^2 \quad \frac{1}{4^2} = 4^{-2}$$

$$4^{-2}$$
 1 mark

(1)

- (b) Work out the value of $8^{\frac{5}{3}} - 9^{\frac{3}{2}}$

$$8^{5/3} \rightarrow \sqrt[3]{8^5} = 2$$

1 mark for either of these

$$2^5 = 32$$

$$9^{3/2} \rightarrow \sqrt{9^3} = 3$$

$$3^3 = 27$$

$$\text{so } 32 - 27 = 5$$

1 mark for either of these

$$5$$
 Final mark

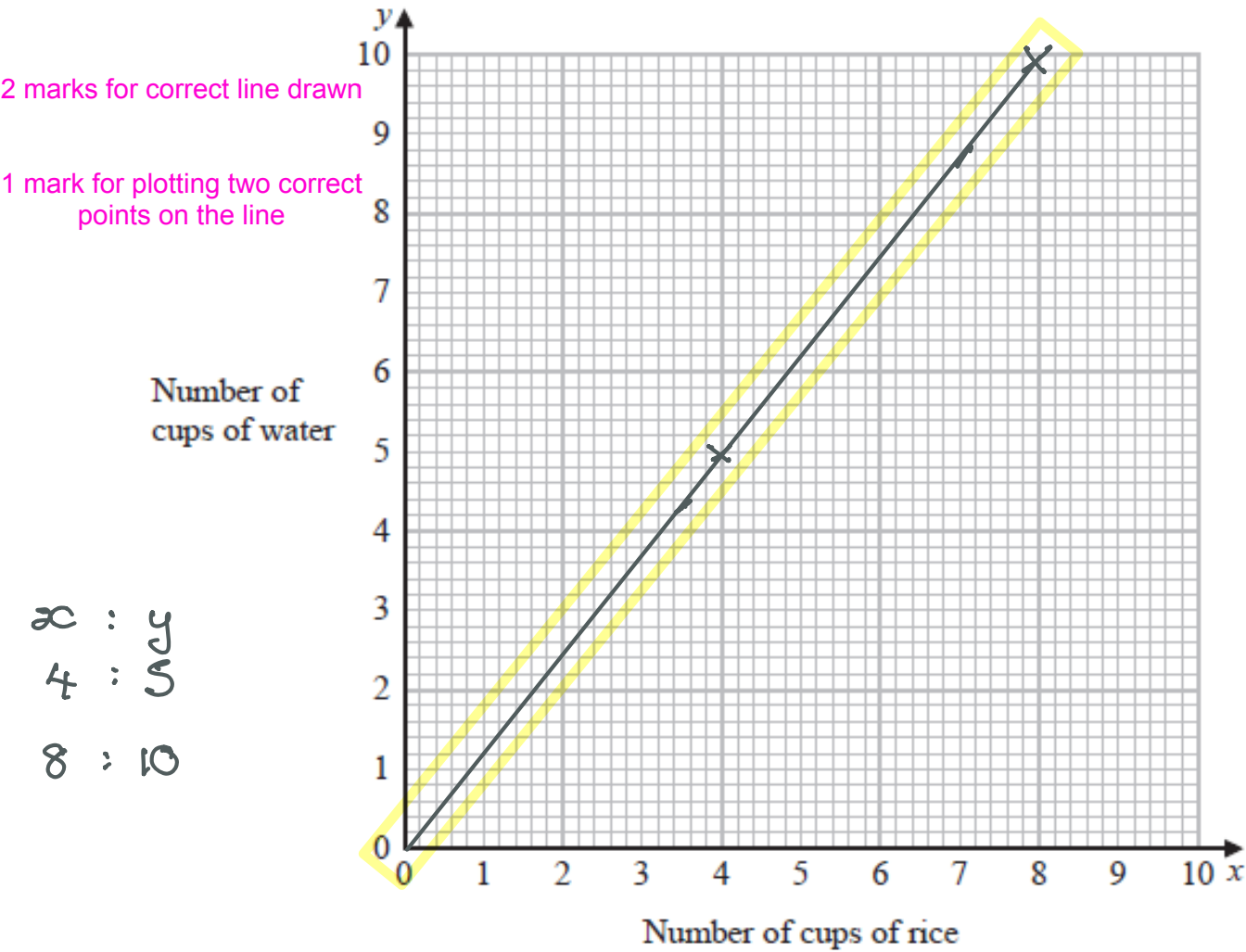
(3)

(Total for Question 4 is 4 marks)

5 To cook rice

the number of cups of rice (x) : the number of cups of water (y) = 4 : 5

(a) Use this information to draw a graph to show the relationship between the number of cups of rice and the number of cups of water needed to cook rice.



(2)

(b) Find the gradient of the line drawn in part (a).

$\frac{\text{change in } y}{\text{change in } x} = \frac{10}{8} = \frac{5}{4} = 1.25$

1.25

1 mark

(1)

(Total for Question 5 is 3 marks)

- 6 At the start of year n the population of a species is P_n

At the start of the following year the population of the species is given by

$$P_{n+1} = kP_n \text{ where } k \text{ is a positive constant.}$$

The population of the species at the start of year 1 is 8 million.

The population of the species at the start of year 2 is 6 million.

Work out the population of the species at the start of year 3

1 mark

$$6 = k \times 8$$

$$k = \frac{6}{8} = \frac{3}{4}$$

$$P_3 = \frac{3}{4} \times 6$$

1 mark

$$= \frac{18}{4} \quad \frac{18}{4} = \frac{9}{2} = 4.5$$

4.5

Final mark

million

(Total for Question 6 is 3 marks)

- 7 Factorise $6x^2 - 5x - 4$

$$6 \times 4 = 24 \quad 1, 24 \quad 2, 12 \quad 3, 8$$

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

$$3x(2x+1) - 4(2x+1)$$

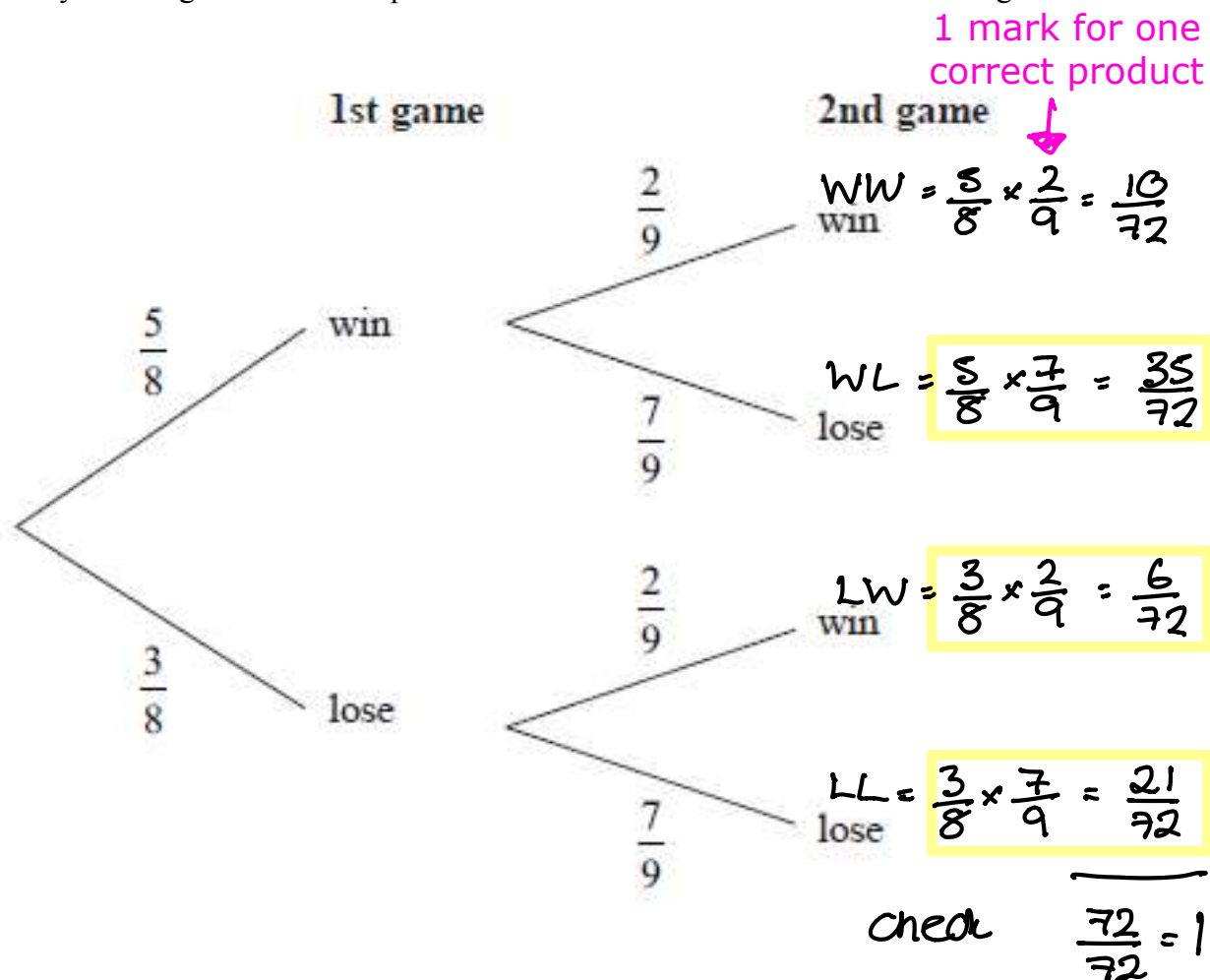
$$(3x-4)(2x+1)$$

2 marks

1 mark may be awarded if not fully correct for $(3x \mp 4)(2x \mp 1)$ (Total for Question 7 is 2 marks)

8 Martha plays a game twice.

The probability tree diagram shows the probabilities that Martha will win or lose each game.



Find the probability that Martha will lose at least one game.

$$P(WL) + P(LW) + P(LL)$$

$$= \frac{35}{72} + \frac{6}{72} + \frac{21}{72}$$

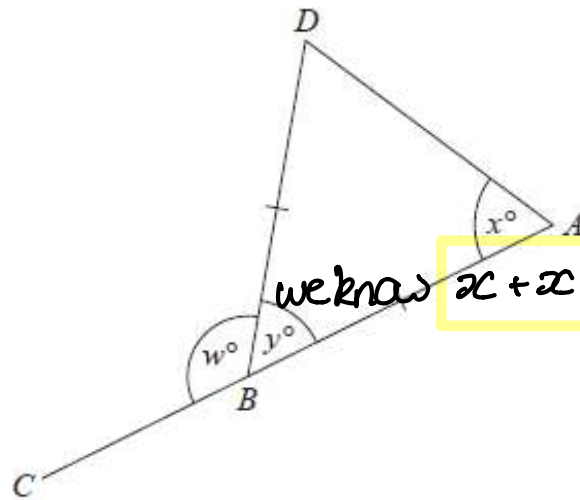
1 mark

Final mark

$$\frac{62}{72}$$

(Total for Question 8 is 3 marks)

- *9 The diagram shows an isosceles triangle ABD and the straight line ABC .



we know $x + x + y = 180$

1 mark

$BA = BD$

$x : y = 2 : 1$

Work out the value of w .

$x : y$

$2 : 1$

so $x = 2y$

so using $x + x + y = 180$

$2y + 2y + y = 180$

$5y = 180$

$y = 180 \div 5$

$y = 36$

1 mark for either of these

$$\begin{array}{r} 36 \\ 5 \overline{) 180} \\ \underline{180} \\ 0 \end{array}$$

so $w = 180 - 36$
 $= 144$

1 mark

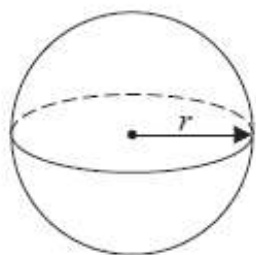
144

Final mark

$w = \dots\dots\dots$

(Total for Question 9 is 4 marks)

10 Here is a sphere.



$$\text{Surface area of sphere} = 4\pi r^2$$

$\frac{3}{8}$ of the surface area of this sphere is $75\pi \text{ cm}^2$

Find the diameter of the sphere.

Give your answer in the form $a b$ where a is an integer and b is a prime number.

$$\frac{8}{8} = 4\pi r^2 \quad \frac{3}{8} = 75\pi \quad \frac{1}{8} = 25\pi$$

$$25\pi \times 8 = 200\pi \quad 1 \text{ mark}$$

$$200\pi = 4\pi r^2$$

$$r^2 = \frac{200}{4} = 50 \quad 1 \text{ mark}$$

$$r = \sqrt{50} = \sqrt{2} \sqrt{25}$$

$$= 5\sqrt{2} \quad 1 \text{ mark}$$

$$\text{so diameter} = 10\sqrt{2}$$

$$10\sqrt{2} \quad \text{Final mark}$$

..... cm
(Total for Question 10 is 4 marks)

11 Spinner A and spinner B are each spun once.

The probability that spinner A lands on red is $\frac{1}{4}$

The probability that both spinner A and spinner B land on red is $\frac{1}{24}$

Work out the probability that one spinner lands on red and the other spinner does **not** land on red.

$$\text{Red}_A \times \text{Red}_B = \text{Two Reds}$$

$$\frac{1}{4} \times \text{Red}_B = \frac{1}{24} \quad 1 \text{ mark}$$

$$\text{so } \text{Red}_B = \frac{1}{6}$$

$$P(R, \text{Not } R) + P(\text{Not } R, R)$$

1 mark for either of these

$$\frac{1}{4} \times \frac{5}{6} + \frac{3}{4} \times \frac{1}{6}$$

$$\frac{5}{24} + \frac{3}{24} = \frac{8}{24}$$

1 mark

$$\frac{8}{24} = \frac{1}{3}$$

$$\frac{1}{3}$$

Final mark

(Total for Question 11 is 4 marks)

*12 The table shows information about the daily rainfall in a town for 60 days.

2 marks for fully correct diagram

Rainfall (R mm)	Frequency
$0 \leq R < 5$	8
$5 \leq R < 10$	24
$10 \leq R < 15$	13
$15 \leq R < 20$	11
$20 \leq R < 25$	4

1 mark may be given if:

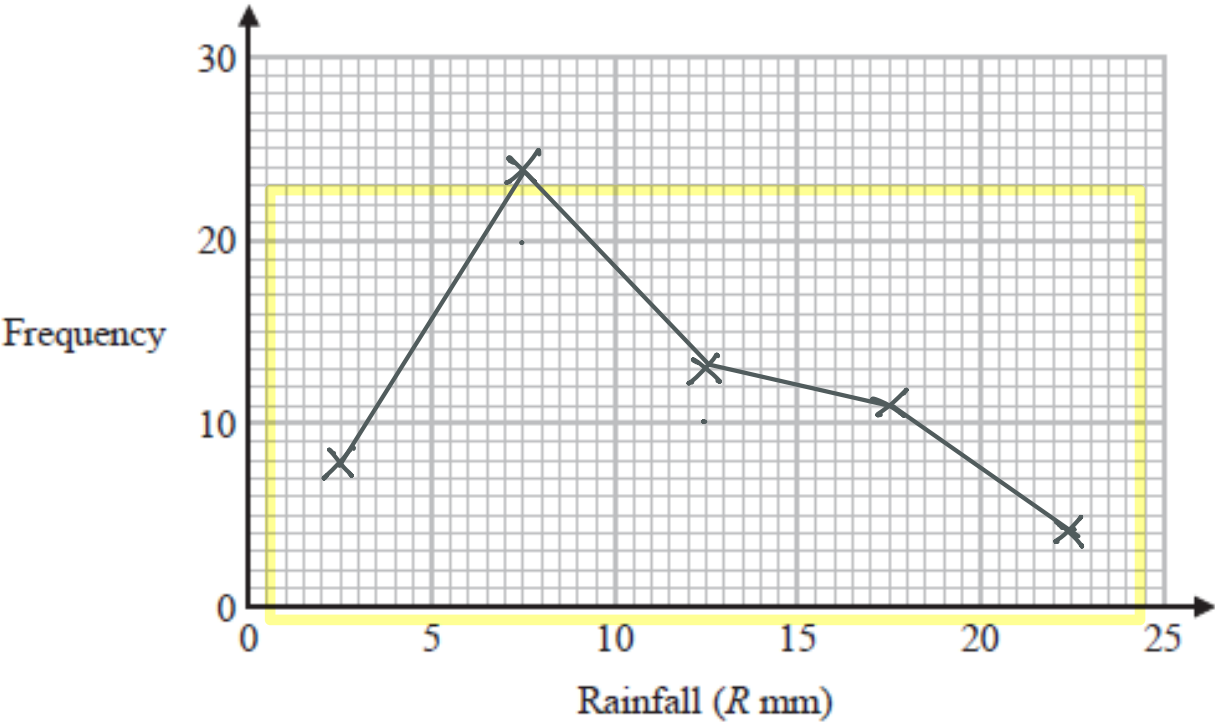
Points correct but not joined, or

First and last points joined, or

One point plotted incorrectly, or

All correct heights plotted at endpoint of intervals

Draw a frequency polygon for this information.



(Total for Question 12 is 2 marks)

TOTAL FOR PAPER IS 35 MARKS