

GCSE Mathematics (1MA1) – Aiming for Grade 6 2H

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 6 on similar questions from either the Summer 2023 or November 2023 exam sittings achieved on average 24.4 marks from these questions.

Grade	9	8	7	6	5	4	3
Mark	29.8	28.6	27.4	24.4	20.2	14.0	8.6

Answer all questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 Shakir has to complete two tests.

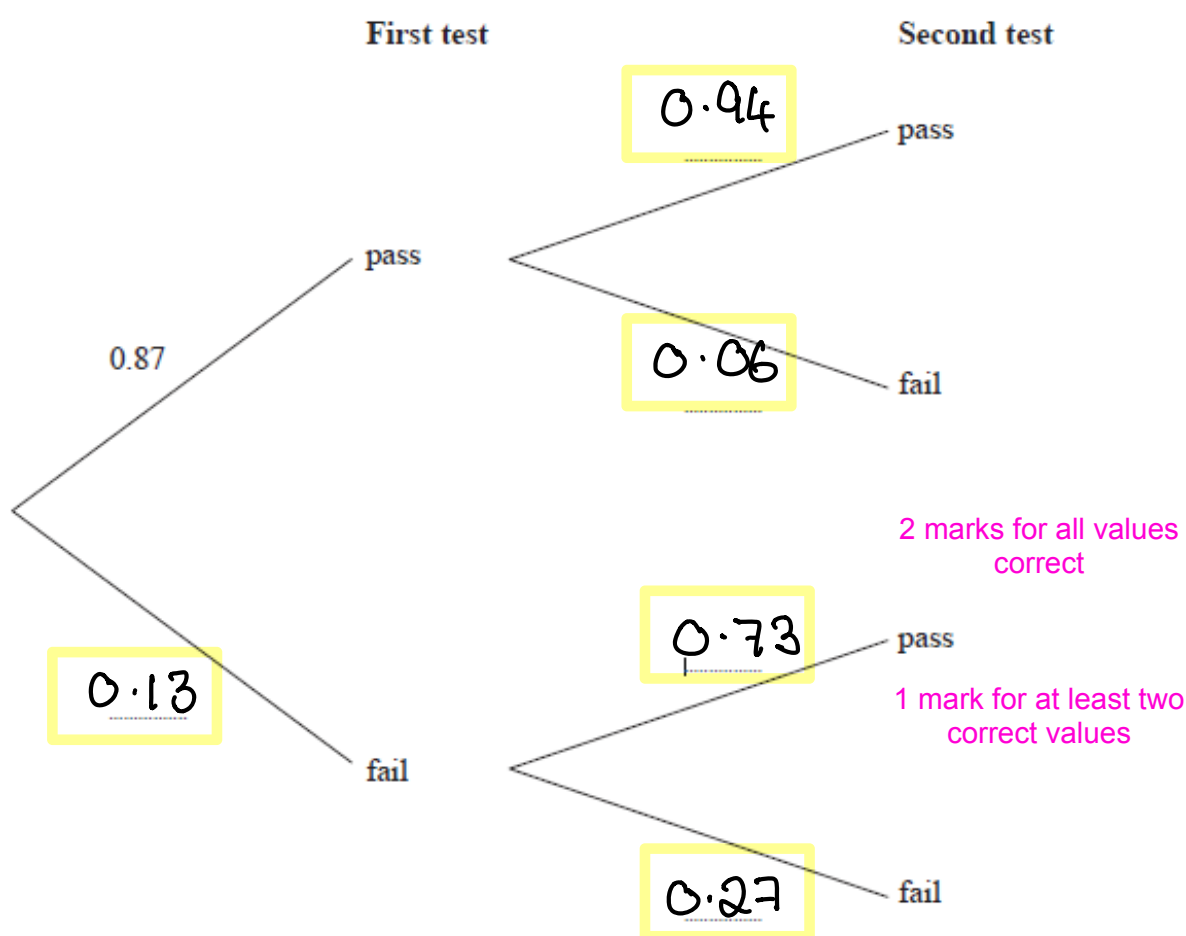
He can either pass or fail each test.

The probability that he will pass the first test is 0.87

If he passes the first test the probability he will pass the second test is 0.94

If he fails the first test the probability he will pass the second test is 0.73

(a) Complete the probability tree diagram for this information.



$$PP + PF + FP$$

(b) Work out the probability that Shakir passes at least one of the tests.

(2)

$$\begin{array}{l} 0.87 \times 0.94 \\ + \\ 0.87 \times 0.06 \\ + \\ 0.13 \times 0.73 \end{array} \left. \vphantom{\begin{array}{l} 0.87 \times 0.94 \\ + \\ 0.87 \times 0.06 \\ + \\ 0.13 \times 0.73 \end{array}} \right\} 0.9649$$

1 mark

Final mark

0.9649

(3)

(Total for Question 1 is 5 marks)

- *2 A number, d , is rounded to 1 decimal place.
The result is 12.7

Complete the error interval for d .

12.6 12.7 12.8
 ↑ ↑

1 mark

1 mark

$$\boxed{12.65} \leq d < \boxed{12.75}$$

(Total for Question 2 is 2 marks)

- 3 A number x is written correct to 2 significant figures.
The result is 1.9
Complete the error interval for x .

1.8 1.9 2.0
 ↑ ↑

1 mark

1 mark

$$\boxed{1.85} \leq x < \boxed{1.95}$$

(Total for Question 3 is 2 marks)

- 4 Expand and simplify $(x + 7)(x - 2)(x + 3)$

$$\boxed{x^2 - 2x + 7x - 14} = x^2 + 5x - 14$$

1 mark

$$(x + 3)(x^2 + 5x - 14)$$

$$= \boxed{x^3 + 5x^2 - 14x + 3x^2 + 15x - 42}$$

1 mark

$$= x^3 + 8x^2 + x - 42$$

$$\boxed{x^3 + 8x^2 + x - 42}$$

Final mark

(Total for Question 4 is 3 marks)

5 Use algebra to solve the simultaneous equations

1 mark for
elimination of
'x' or 'y'

$$\begin{array}{l} 2x + 6y = 5 \quad (1) \quad \times 3 \\ 3x - 4y = -12 \quad (2) \quad \times 2 \end{array}$$

$$\begin{array}{l} 18 - -8 = 26 \\ 15 - -24 = 39 \end{array}$$

$$\begin{array}{r} 6x + 18y = 15 \quad (3) \\ 6x - 8y = -24 \quad (4) \\ \hline - \quad \quad \quad 26y = 39 \\ y = \frac{39}{26} = 1.5 \end{array}$$

1 mark for
 $y=1.5$ or $x=-2$

1 mark for
substitution of
'x' or 'y'

$$\begin{array}{l} \text{sub into (1)} \quad 2x + 6(1.5) = 5 \\ 2x = -4 \\ x = -2 \end{array}$$

$$\begin{array}{l} x = \dots\dots\dots -2 \\ y = \dots\dots\dots 1.5 \end{array}$$

Final mark

(Total for Question 5 is 4 marks)

*6 $-2 \leq n < 5$

n is an integer.

(a) Write down the greatest possible value of n .

$$-2, -1, 0, 1, 2, 3, \boxed{4}$$

1 mark

(1)

(b) Solve $\frac{2}{5}g - 4 < 6$

1 mark for '+ 4'
to both sides

$$\begin{array}{l} \frac{2}{5}g - 4 < 6 \\ +4 \quad +4 \\ \hline \frac{2}{5}g < 10 \end{array}$$

1 mark for 'x 5'
to both sides

$$\begin{array}{l} \frac{2}{5}g < 10 \\ \times 5 \quad \times 5 \\ \hline 2g < 50 \end{array}$$

$$g < \frac{50}{2}$$

$$g < 25$$

Final mark

(3)

(Total for Question 6 is 4 marks)

7 Show that the equation $x^4 - x^2 - 5 = 0$ can be written in the form $x = \sqrt[4]{x^2 + 5}$

$$x^4 = x^2 + 5$$
$$x = \sqrt[4]{x^2 + 5}$$

1 mark for correct rearrangement must see

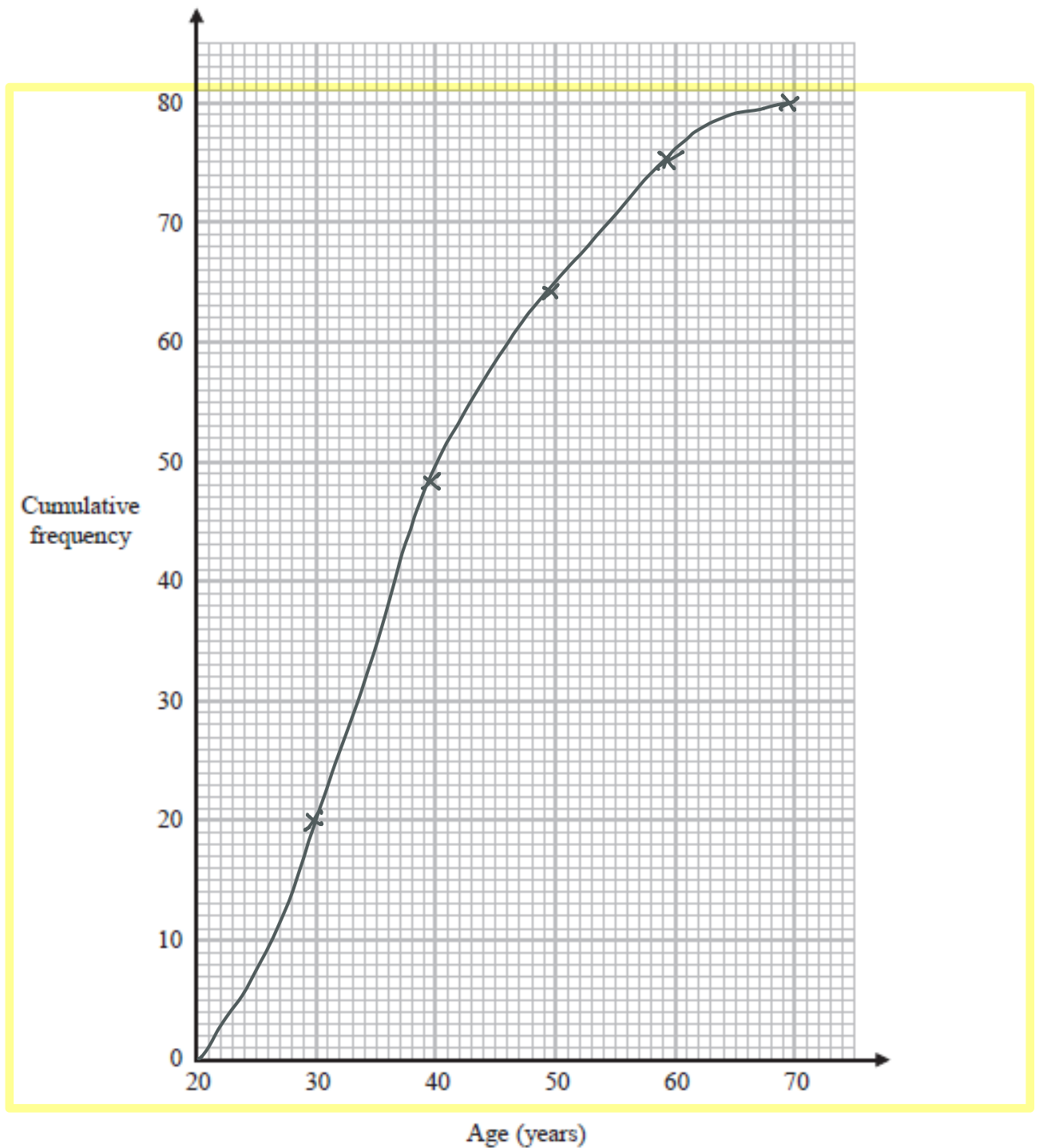
(Total for Question 7 is 1 mark)

8 The cumulative frequency table gives information about the ages of 80 people working for a company.

Age (a years)	Cumulative frequency
$20 < a \leq 30$	20
$20 < a \leq 40$	48
$20 < a \leq 50$	64
$20 < a \leq 60$	75
$20 < a \leq 70$	80

On the grid on the next page, draw a cumulative frequency graph for this information.

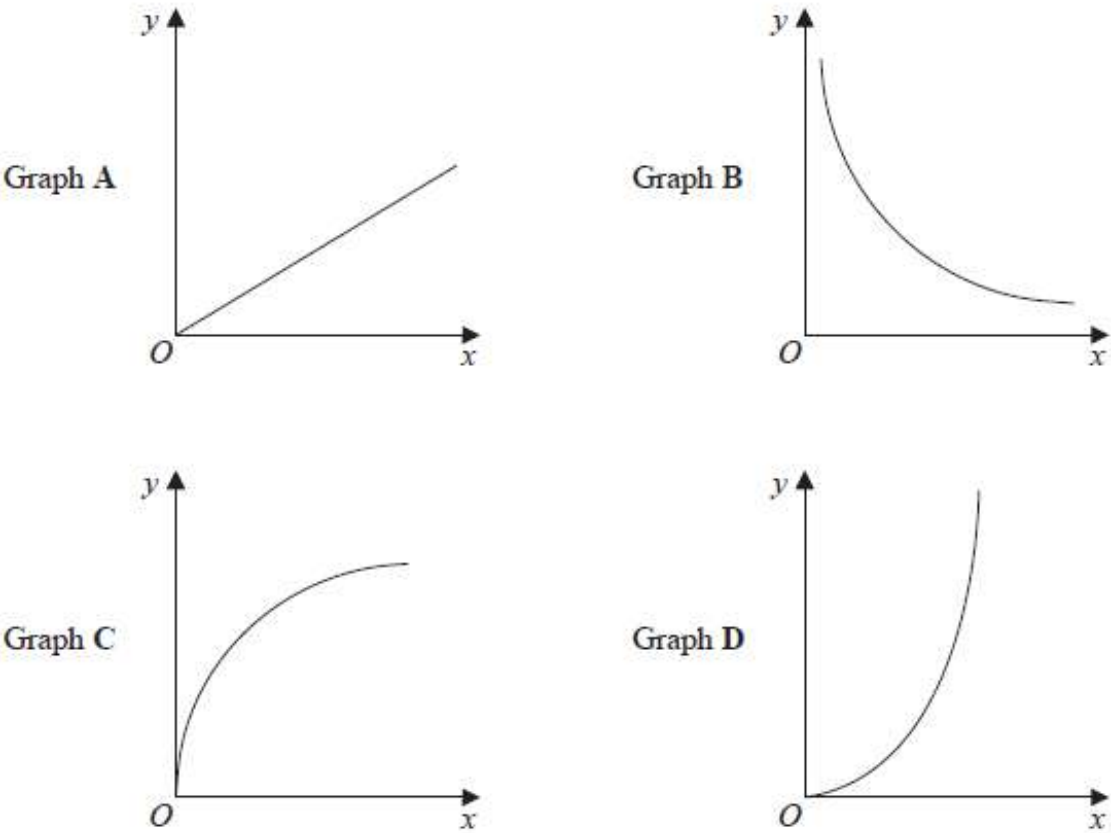
(2)



2 marks for correct graph

(Total for Question 8 is 2 marks)

1 mark may be awarded if points plotted consistently within all class intervals (ie not at end points) and joined with a curve



The graphs of y against x represent four different types of proportionality.
Match each type of proportionality in the table to the correct graph.

Type of proportionality	Graph
$y \propto x^2$	D
$y \propto x$	A
$y \propto \frac{1}{x}$	B
$y \propto \sqrt{x}$	C

2 marks for all values correct

1 mark for at least two correct values

(Total for Question 9 is 2 marks)

10 The functions f and g are such that

$$f(x) = (2x + 3)^2 \quad \text{and} \quad g(x) = 2x - 1$$

Find $gf(-3)$

$$\begin{aligned} gf(-3) &= 2(2x+3)^2 - 1 \\ &= 2(2 \times -3 + 3)^2 - 1 \quad 1 \text{ mark} \\ &= 2(-3)^2 - 1 \\ &= 2 \times 9 - 1 = 17 \end{aligned}$$

Final mark

17

(Total for Question 10 is 2 marks)

*11 Chris, Debbie and Errol share some money in the ratio 3 : 4 : 2
 Debbie gets £120
 Chris then gives some of his share to Debbie and some of his share to Errol.
 The money that Chris, Debbie and Errol each have is now in the ratio 2 : 5 : 3
 How much money did Chris give to Errol?

C	D	E	
3	4	2	
↓	↓	↓	
x 30	x 30	x 30	1 mark
£90	£120	£60	

Total = £270

C	D	E	
2	5	3	
└──────────┘			
270 ÷ 10 = 27			1 mark

2 × 27	5 × 27	3 × 27
= £54	= £135	= £81

1 mark

£81 - 60
= £21

21

Final mark

£.....
 (Total for Question 11 is 4 marks)

TOTAL FOR PAPER IS 31 MARKS