GCSE Mathematics (1MA1) – Aiming for Grade 5 3F

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 5 on similar questions from either the Summer 2023 or November 2023 exam sittings achieved on average 24.5 marks from these questions**.**

Grade	**5**	**4**	**3**	**2**	**1**
Mark	25.8	16.7	11.3	7.4	4.7

Answer all questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 The table shows the number of books read by four people in one month.

Person	Number of books
Ximena	7
Martha	9
Kezia	1
Tabby	5

(*a*) Work out the median number of books.

1 5 7 9

↑

6

1 mark

(2)

(*b*) Find the range.

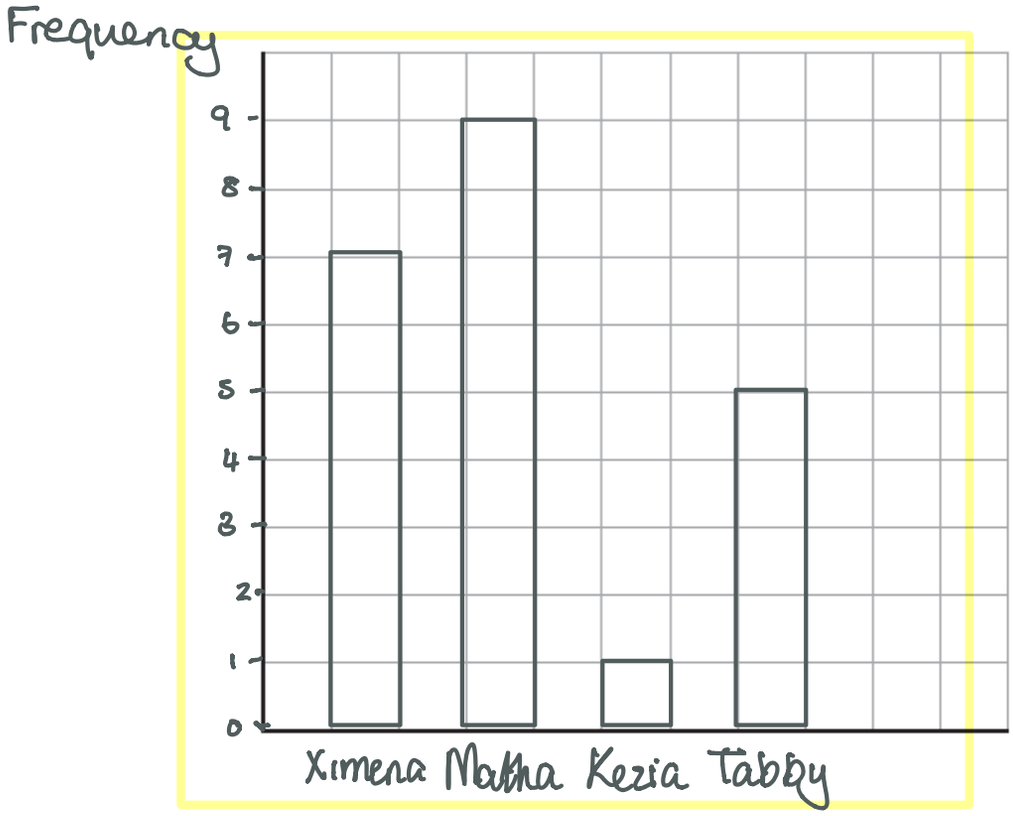
9 - 1

8

1 mark

(1)

(*c*) On the grid, draw a bar chart to show the information in the table.



1 mark for fully correct bar chart

Or 1 mark for correct scale or name labels

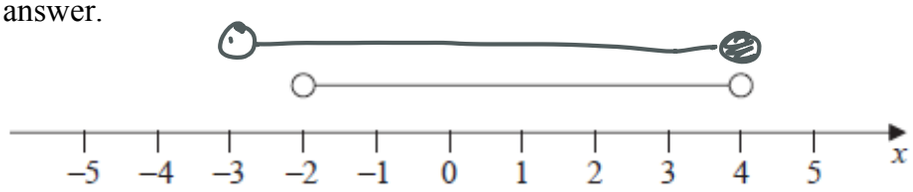
Or 1 mark for at least two correct bars

(3)

(Total for Question 1 is 6 marks)

***2** Jenna is asked to show the inequality $-3 < x \leq 4$ on a number line.

Here is her answer.



(*a*) Write down two mistakes Jenna has made.

1 The circle at -2 should be at -3 1 mark

2 The circle at 4 should be solid. 1 mark

(2)

(*b*) Work out the greatest integer that satisfies the inequality

$$5y - 7 < 16$$

$5y - 7 < 16$

$+7 \quad +7$

1 mark $5y < 23$

$\div 5 \quad \div 5$

1 mark $y < 4.6$

4 Final mark

(2)

(Total for Question 2 is 4 marks)

***3** Lava flows from a volcano at a constant rate of 11.9 m^3/s

How many days does it take for 67 205 600 m^3 of lava to flow from the volcano?
Give your answer correct to the nearest day.

67 205 600 ÷ 11.9 1 mark

= 5647529.412 seconds

1 mark ÷ 86400 = 65.3649... days

1 day = 60 × 60 × 24 = 86400 seconds

65 Final mark days

(Total for Question 3 is 3 marks)

4 Jenny invests £3000 for 6 years at y% simple interest per year.

At the end of the 6 years, Jenny has received a total of £450 in interest.

Work out the value of y.

1 mark $450 \div 6 = 75$ per year

1 mark $\frac{75}{3000} \times 100 = 2.5$

$y =$ 2.5 Final mark

(Total for Question 4 is 3 marks)

---

5 120 boxes cost £6
270 bags cost £10

A bag is cheaper than a box.

How much cheaper?
Give your answer in pence correct to 1 decimal place.

120 boxes = 600p
÷120
1 box = 5p

1 mark

270 bags = 1000p
÷270
1 bag = 3.7037... p

1 mark

Difference = 5 − 3.7037... 1 mark

= 1.296...

so 1.3p

1.3 Final mark

.....p

(Total for Question 5 is 4 marks)

Range accepted 1.29 to 1.3

***6** Seija works at a weather station.
The table gives information about the temperature, T °C, at midday for each of 50 cities in the UK on Tuesday.

Temperature (T °C)		Frequency	
$10 < T \leq 15$ (12.5)	×	2	= 25
$15 < T \leq 20$ (17.5)	×	8	= 140
$20 < T \leq 25$ (22.5)	×	13	= 675
$25 < T \leq 30$ (27.5)	×	21	= 577.5
$30 < T \leq 35$ (32.5)	×	6	= 195
		50	

1 mark

(a) Calculate an estimate for the mean temperature.

$$\frac{25 + 140 + 675 + 577.5 + 195}{50}$$

1 mark

$$= \frac{1230}{50}$$

Final mark

24.6 ..... °C

(3)

Seija says,

> "The median temperature is 22.5 °C because 22.5 is the middle number in the middle group."

(b) Is Seija correct?
Give a reason for your answer.

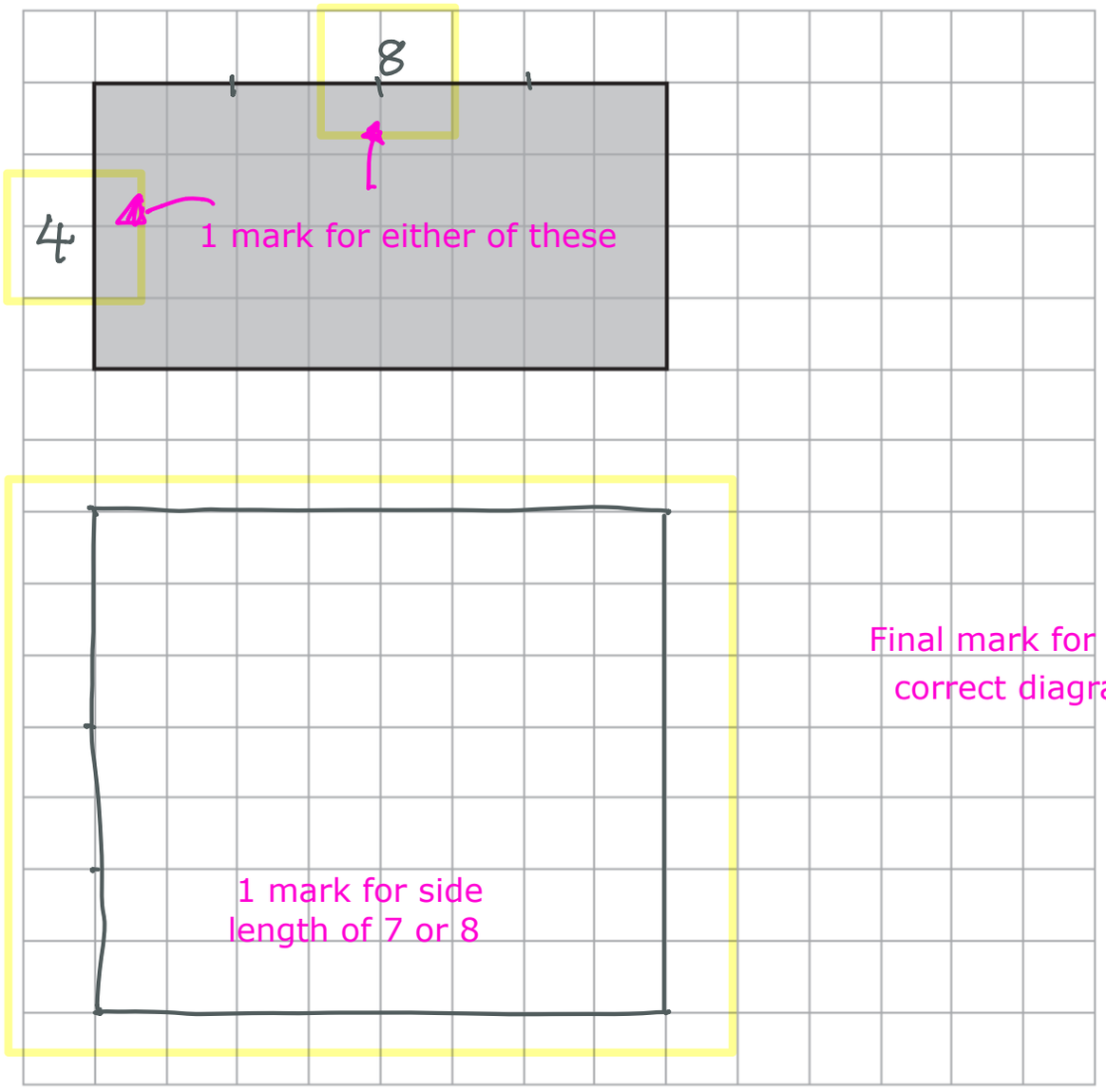
50 ÷ 2 = 25 2 + 8 = 10 ✗ 10 + 13 = 23 ✗

No its in the $25 < T \leq 30$ interval 1 mark

(1)

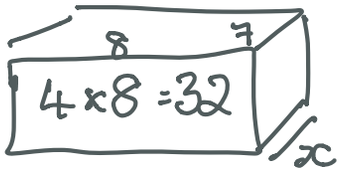
(Total for Question 6 is 4 marks)

7 The front elevation of a cuboid is shown on the centimetre grid below.



The volume of the cuboid is 224 cm^3

On the grid, draw the plan of the cuboid.

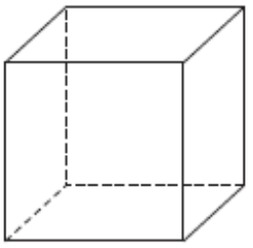


$32 \times x = 224$

$x = \frac{224}{32} = 7$

(Total for Question 7 is 3 marks)

***8** The diagram shows a solid cube placed on a horizontal table.



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

The pressure on the table due to the cube is 3.5 newtons/cm^2
The force exerted by the cube on the table is 504 newtons.

Show that the total surface area of the cube is less than 900 cm^2

$3.5 = \frac{504}{\text{area}}$ 1 mark

$\text{area} = \frac{504}{3.5}$

$= 144 \text{ cm}^2$ ← 1 face

Total surface area

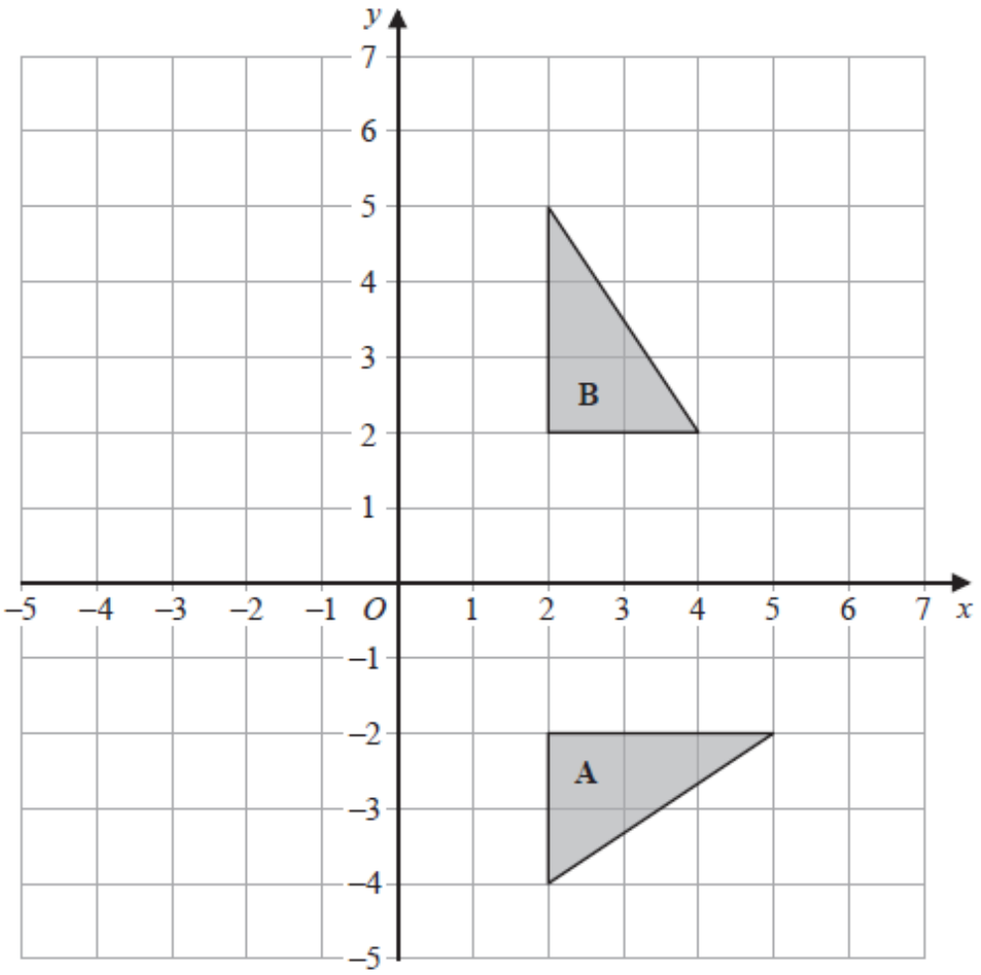
$= 144 \times 6$ 1 mark

$= 864 \text{ cm}^2$ Final mark

$864 < 900$

(Total for Question 8 is 3 marks)

9



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

Rotation of 90° about (0,0)

1 mark 1 mark

(Total for Question 9 is 2 marks)

***10** A and B are numbers such that

$$A = 2^2 \times 3^4 \times 7$$
$$B = 3^2 \times 7^2$$

(a) Find the highest common factor (HCF) of A and B.

$A = 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 7$

$B = 3 \times 3 \times 7 \times 7$

HCF $= 3 \times 3 \times 7$

63 1 mark

(1)

(b) Find the lowest common multiple (LCM) of A and B.

LCM $= 63 \times 2 \times 2 \times 3 \times 3 \times 7$ 1 mark

$= 15876$

15876 Final mark

(2)

(Total for Question 10 is 3 marks)

***11** It takes 14 hours for 5 identical pumps to fill a water tank.

How many hours would it take 4 of these pumps to fill another water tank of the same size?

1 mark

14 hours = 5 pumps ÷5 (inverse proportion)

×5

70 hours 1 pump

÷4 ×4

17·5 hours 4 pumps

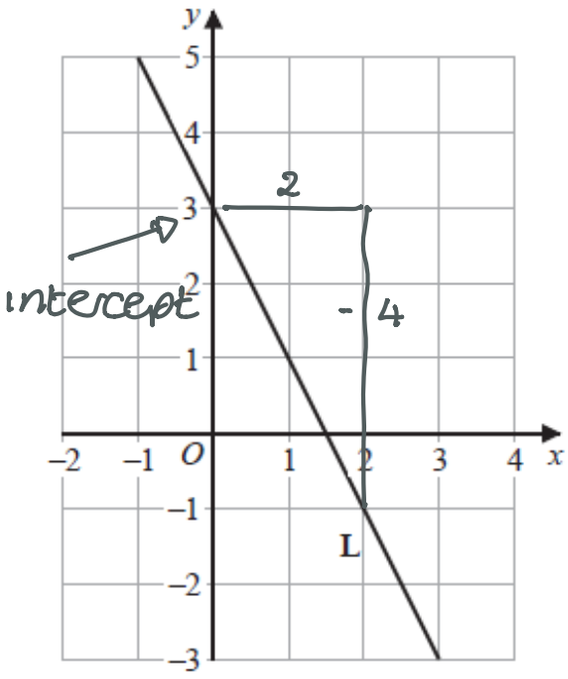
Final mark

17·5 hours

(Total for Question 11 is 2 marks)

***12** The line **L** is shown on the grid.

Find an equation for **L**.



gradient $= \frac{-4}{2} = -2$ 1 mark

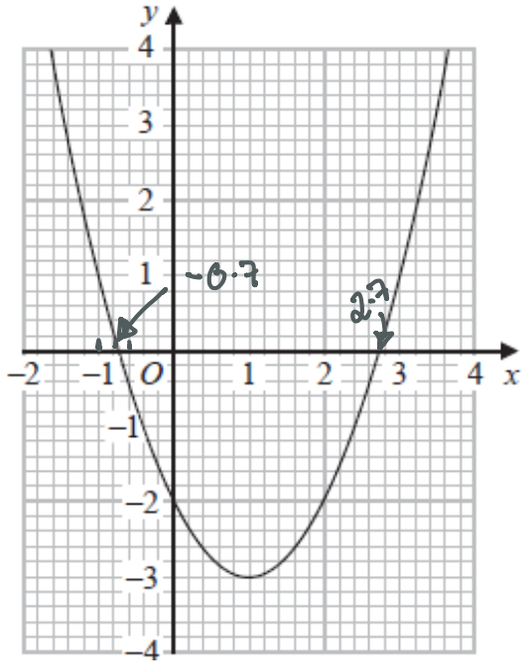
$y = -2x + 3$

1 mark

Final mark $y = -2x + 3$

(Total for Question 12 is 3 marks)

***13** Here is the graph of $y = x^2 - 2x - 2$



Write down an estimate for one of the roots of $x^2 - 2x - 2 = 0$

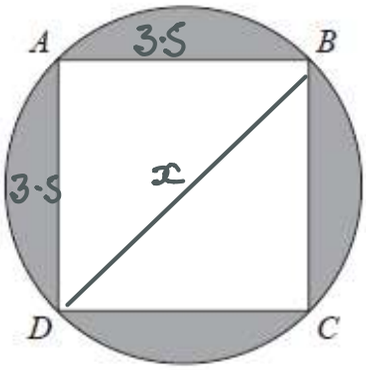
1 mark

-0.7 OR 2.7

(Total for Question 13 is 1 mark)

Range accepted -0.6 to -0.8 and 2.6 to 2.8

14 A, B, C and D are points on a circle such that $ABCD$ is a square.



The square $ABCD$ has sides of length 3.5 cm.

Calculate the circumference of the circle.
Give your answer correct to 1 decimal place.
You must show all your working.

diameter

$x^2 = 3.5^2 + 3.5^2$ 1 mark

$= 24.5$

$x = \sqrt{24.5}$

$= 4.9497...$ 1 mark

Circumference

$= \pi \times 4.9497...$ 1 mark

$= 15.550...$

Final mark 15.6 ..... cm

(Total for Question 14 is 4 marks)

Range accepted 15 to 16

TOTAL FOR PAPER IS 45 MARKS