

For **AQA**

# Mathematics

## Paper 1 (Non-Calculator)

### Foundation Tier

#### Churchill Paper 1D – Marking Guide

Method marks (M) are awarded for a correct method which could lead to a correct answer

Accuracy marks (A) are awarded for a correct answer, having used a correct method, although this can be implied

(B) marks are awarded independent of method



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### Churchill Paper 1D Marking Guide – AQA Foundation Tier

**1**    -14    -4.5    4.5    14    B1    Total 1

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**2**    6    3    3x    6x    B1    Total 1

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**3**    = 4 + 18 = 22  
       6    10    22    26    B1    Total 1

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**4**    **A**    **B**    **C**    **D**    B1    Total 1

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**5**    **(a)**    = 4 × 4 = 16    B1

**(b)**    Wednesday = 8  
       Friday = 16 + 1 = 17  
       Fri – Wed = 17 – 8 = 9    B1

**(c)**    Tuesday = 10  
       Thursday = 65 – (16 + 10 + 8 + 17)  
                   = 65 – 51 = 14    M1

Monday	○ ○ ○ ○
Tuesday	○ ○ ◐
Wednesday	○ ○
Thursday	○ ○ ○ ◐
Friday	○ ○ ○ ○ ◐

A1

Total 4

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**6**    10% of £150 = 150 ÷ 10 = £15  
       20% of £150 = 2 × 15 = £30  
       Number of weeks = 450 ÷ 30 = 15 weeks    M1  
A1    Total 2

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**7**    **(a)**    1 km = 1000 m  
           1000 ÷ 250 = 4  
           The path will be 4 cm long on the map    M1  
A1

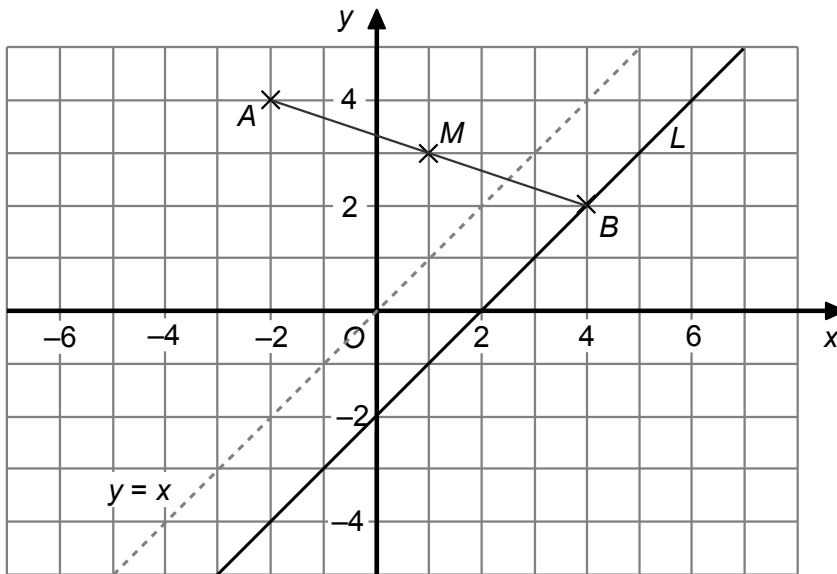
**(b)**    9 × 250 = 1000 + 1000 + 250 = 2250 m  
           2250 m = 2.25 km    M1  
A1    Total 4

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8 (a)  $(-2, 4)$

B1

(b)



$(1, 3)$

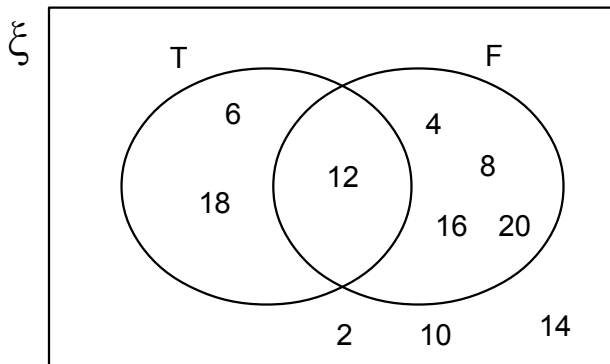
B1

(c)  $y = x - 2$

[M1 for line drawn or gradient]

M1 A1 Total 4

9 (a)



M2 A1

(b) There are 10 numbers and 1 is in the intersection

$$P(T \cap F) = \frac{1}{10}$$

B1

(c) 6 and 12, 6 and 18, 12 and 18

B1 Total 5

<b>10</b>	<b>(a)</b>	$13 \times 31 = 403$ $0.13 \times 31 = 4.03$ $0.13 \times 3.1 = 0.403$	B1	
	<b>(b)</b>	$403 \div 13 = 31$ $806 \div 13 = 62$ $8060 \div 13 = 620$ $8060 \div 1.3 = 6200$	M1 A1	
	<b>(c)</b>	$52 = 4 \times 13 = 2^2 \times 13$ $4030 = 10 \times 403 = 2 \times 5 \times 13 \times 31$ HCF = $2 \times 13 = 26$	M1 A1	Total 5

<b>11</b>	$= 6^2 = 36$			
	6	12	36	216
			B1	Total 1

<b>12</b>	$6 + 7 + 11 = 24$ At the start, Fiona has $\frac{7}{24}$ of all the marbles	B1	
	$5 + 4 = 9$ so at the end, Fiona has $\frac{5}{9}$ of $\frac{1}{2}$ the marbles		
	$\frac{5}{9}$ of $\frac{1}{2} = \frac{5}{9} \times \frac{1}{2} = \frac{5}{18}$ of all the marbles	M1	
	$\frac{7}{24} = \frac{7 \times 3}{24 \times 3} = \frac{21}{72}$		
	$\frac{5}{18} = \frac{5 \times 4}{18 \times 4} = \frac{20}{72}$	M1	
	$\frac{20}{72}$ is less than $\frac{21}{72}$ so Fiona has less marbles	A1	Total 4

<b>13</b>	<b>(a)</b>	e.g. Total = $9 \times 10.99 + 3 \times 7.95 + 4 \times 3.85$ $\approx 9 \times 11 + 3 \times 8 + 4 \times 4$ $\approx 99 + 24 + 16$ $\approx \text{£}139$ $5 + 3 + 2 = 10$ $139 \div 10 = \text{£}13.90$ Penny pays $3 \times \text{£}13.90$ $\approx 3 \times 14$ $\approx \text{£}42$	M1 M1 A1 M1 A1	
	<b>(b)</b>	e.g. An overestimate because I rounded some numbers up	B1	
		<i>[Mark for reason consistent with their method]</i>		Total 6

<b>14</b>	$5\% = 14$ $2.5\% = 7$ $27.5\% = 28 + 28 + 14 + 7 = 77$			
	49	63	77	91
			B1	Total 1

- 15  $P(\text{£1 or £5}) = 1 - 0.48 = 0.52$   
 $P(\text{£5}) = 0.52 \div 4 = 0.13$   
 $P(\text{£1}) = 3 \times 0.13 = 0.39$

0.13

0.36

0.39

0.75

B1

Total 1

- 16 As  $AC = CD$ , triangle  $ACD$  is isosceles so angle  $CAD = \text{angle } ADC$   
 So, angle  $ADC = \frac{1}{2}(180 - 90) = \frac{1}{2} \times 90 = 45^\circ$   
 As  $AB = AC = BC$ , triangle  $ABC$  is equilateral so angle  $ACB = 60^\circ$   
 Hence, angle  $BCD = 90 + 60 = 150^\circ$   
 As  $BC = CD$ , triangle  $BCD$  is isosceles so angle  $BDC = \text{angle } CBD$   
 So, angle  $BDC = \frac{1}{2}(180 - 150) = \frac{1}{2} \times 30 = 15^\circ$   
 Angle  $ADB = \text{angle } ADC - \text{angle } BDC = 45 - 15 = 30^\circ$

B1

M1

M1

A1

Total 4

- 17 (a) 7

B1

- (b)  $N - 1$

B1

- (c) e.g. Each pattern has 3 triangles on the bottom row  
 Each pattern has 4 triangles on the other rows  
 The number of rows above the bottom row is the same as the number of circles  
 With 16 circles the number of triangles =  $16 \times 4 + 3$   
 $= 64 + 3$   
 $= 67$

M1

M1

A1

[Or, for example, no. of triangles = 3, 7, 11, 15 so  $4N - 1$ ;  
 16 circles means  $N = 17$ ; no. of triangles =  $4 \times 17 - 1 = 67$ ]

Total 5

- 18 (a)  $= \frac{16}{5} \div \frac{6}{5}$   
 $= \frac{16}{5} \times \frac{5}{6}$   
 $= \frac{16}{1} \times \frac{1}{6}$   
 $= \frac{8}{3}$   
 $= 2\frac{2}{3}$

M1

M1

A1

- (b) e.g. 
$$\begin{array}{r} 53 \\ \times 24 \\ \hline 212 \\ 1060 \\ \hline 1272 \end{array}$$

M1

So,  $24 \times 53 = 1272$   
 $0.24 \times 5.3 = 1.272$

M1 A1 Total 6

<b>19 (a)</b>	Width:	$x + x + 1 = 7$	M1	
	(of diagram)	$2x = 6$		
		$x = 3$		
	Height:	$x + y + 2 = 4y + 2$		
(of diagram)		$3 + y + 2 = 4y + 2$	M1	
		$3 = 3y$	A1	
		$y = 1$		
<b>(b)</b>	e.g. $4y + 2 = 4 + 2 = 6$		M1	
	Area of "whole" rectangle = $7 \times 6 = 42 \text{ m}^2$			
	Small rectangle removed measures $x$ by $x + 1 = 3$ by $4$			
	Area of "removed" rectangle = $3 \times 4 = 12 \text{ m}^2$			
	Floor area = $42 - 12 = 30 \text{ m}^2$		A1	Total 5

<b>20 (a)</b>	Using Pythagoras', with $c$ as the hypotenuse we have			
So		$a^2 + b^2 = c^2$	M1	
		$6^2 + 8^2 = c^2$		
		$36 + 64 = c^2$		
		$100 = c^2$		
		$c = \sqrt{100}$		
	$c = 10 \text{ cm}$	A1		
<b>(b)</b>	Area of rectangular sides = $5 \times 6 + 5 \times 8 + 5 \times 10$		M1	
	= $30 + 40 + 50$			
	= $120 \text{ cm}^2$			
	Area of triangle = $\frac{1}{2} \times 6 \times 8$		M1	
	= $24 \text{ cm}^2$			
	Surface area = $2 \times 24 + 120$			
	= $48 + 120$			
	= $168 \text{ cm}^2$		A1	Total 5

<b>21 (a)</b>	0.4 mm/s = $3600 \times 0.4 \text{ mm/h}$	M1	
	= $1440 \text{ mm/h}$		
	= $144 \text{ cm/h}$		
	= $1.44 \text{ m/h}$		
<b>(b)</b>	$x \text{ km/h} = 1000x \text{ m/h}$		
	= $\frac{1000x}{3600} \text{ m/s}$	M1	
	= $\frac{10x}{36} \text{ m/s}$		
	= $\frac{5}{18} x \text{ m/s}$	A1	Total 4

<b>22</b>	Volume = $4^3 = 64 \text{ cm}^3$			
	Density = $\frac{\text{mass}}{\text{volume}} = \frac{80}{64} = \frac{20}{16} = \frac{5}{4} = 1.25 \text{ g/cm}^3$			
0.2	0.8	1.25	5	B1 Total 1

**23** Let Cornpops cost £C and Wheatrings cost £W

Hayfa:  $3C + W = 8$  (1)

Jim:  $2C + 4W = 14$  (2)

M1

$4 \times (1)$   $12C + 4W = 32$  (3)

$(3) - (2)$   $10C = 18$

M1

$C = 1.8$

Sub (1)  $5.4 + W = 8$

$W = 2.6$

M1

Cornpops cost £1.80, Wheatrings cost £2.60, difference = 80p

A1

Total 4

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**24 (a)**  $1 \times 10^9$

B1

**(b)**  $6000^3 = 6^3 \times 1000^3$   
 $= 216 \times 1\,000\,000\,000$   
 $= 216\,000\,000\,000$   
 $= 2.16 \times 100\,000\,000\,000$   
 $= 2.16 \times 10^{11}$

M1

A1

**(c)** Volume =  $\frac{4}{3} \times \pi \times 6371^3$   
 $\approx \frac{4}{3} \times 3 \times 6000^3$   
 $\approx 4 \times 2.16 \times 10^{11}$   
 $\approx 4 \times 2 \times 10^{11}$   
 $\approx 8 \times 10^{11} \text{ km}^3$

M1

A1

*[Accept  $8 \times 10^{11}$  to  $1.2 \times 10^{12}$ , standard form is not required]*

Total 5

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**TOTAL FOR PAPER: 80 MARKS**