

**GCSE
MATHEMATICS
8300/2F**

Foundation Tier

Paper 2 Calculator

Shadow paper based on June 2023 paper

Mark scheme

June 2023

First Half

Version: 1.0

Q	Answer	Mark	Comments
1(a)	40	B1	
	Additional Guidance		
	Mark the answer line. If this is blank, the answer may be seen on the diagram		

Q	Answer	Mark	Comments
1(b)	−8	B1	
	Additional Guidance		
	Mark the answer line. If this is blank, the answer may be seen on the diagram		

Q	Answer	Mark	Comments
2	All 4 correct	B4	B1 for each box correctly matched
	Additional Guidance		
	Connections do not have to be straight lines		
	The line from the second box on the left was given so do not count it		
	To score, a box on the left must be joined to just the correct box on the right.		

Q	Answer	Mark	Comments
3(a)	A and (A =) 14 and (B =) 12	B2	B1 (A =) 14 or (B =) 12 14 and/or 12 may be on the diagram accept 140 and 120
	Additional Guidance		
	Ignore reference to areas of any shapes and perimeters of the other shapes		
	Ignore units, including for 140 and 120		
	If answer line blank, accept A clearly indicated in working		
	Accept 14 on the answer line in place of A with 12 seen for B		B2

Q	Answer	Mark	Comments
3(b)	E	B1	

Q	Answer	Mark	Comments
3(c)	B and D	B1	either order

Q	Answer	Mark	Comments
3(d)	Any correct reflection of shape with corresponding mirror line shown	B2	B1 any correct reflection of shape with no or incorrect mirror line
	Additional Guidance		
	Mark intention for mirror line and shape		
	Ignore internal lines		
	For B2, if there is more than one shape and/or more than one mirror line, apply the rules of choice		
	For B1, any one correct reflection of the shape (even with other incorrect shapes) will score B1		

Q	Answer	Mark	Comments
4(a)	(3, 2)	B1	accept $\begin{smallmatrix} x & y \\ (3, & 2) \end{smallmatrix}$
	Additional Guidance		
	Mark the answer line. If this is blank, the answer may be seen on the diagram but must be the coordinates for P		
	Do not allow x and y within the coordinates eg (3 x , 2 y)		B0

Q	Answer	Mark	Comments
4(b)	(x , -4) where $x \neq 3$	B1	accept eg $\begin{smallmatrix} x & y \\ (6, & -4) \end{smallmatrix}$
	Additional Guidance		
	Do not allow x and y within the coordinates eg (6 x , $-4y$)		B0

Q	Answer	Mark	Comments
5(a)	$5 \div 0.65$ or $500 \div 65$ or $7.69(\dots)$ or 7.7 or 65×7 or 455 or 0.65×7 or 4.55 or 65×8 or 520 or 0.65×8 or $5.2(0)$	M1	oe eg build up or build down
	7	A1	
	Additional Guidance		
	Incorrect work seen is A0 eg $65 \times 7 = 455$ and $65 \times 8 = 530$ Answer 7		M1A0
	Do not allow $5 \div 65$ or $500 \div 0.65$ unless recovered		
	Build up must be fully correct method, no errors, 65, 130, 195, 260, 325, 390, 455, (520)		
	Build down must be fully correct method, no errors, 435, 370, 305, 240, 175, 110, 45		

Q	Answer	Mark	Comments
5(b)	Alternative method 1 Comparing the cost of 40 bottles		
	5.5×0.1 or 0.55 or $1 - 0.1$ or 0.9	M1	oe eg $5.5 \div 10$ discount or multiplier for shop D implied by $5.5 \times 5 \times 0.1$ or 2.75 or 4.95
	$(5.5 - \text{their } 0.55) \times 5$ or $5.5 \times \text{their } 0.9 \times 5$ or 4.95×5 or 24.75	M1dep	oe eg $27.5(0) \times 0.9$ or $27.5(0) - 2.75$ shop D
	13×2 or 26	M1	oe shop F
	D with 24.75 and 26 seen	A1	oe
	Alternative method 2 Comparing the cost of 1 bottle		
	5.5×0.1 or 0.55 or $1 - 0.1$ or 0.9	M1	oe eg $5.5 \div 10$ discount or multiplier for shop D implied by $5.5 \div 8 \times 0.1$ or 0.06(875) or 4.95
	$(5.5 - \text{their } 0.55) \div 8$ or $5.5 \times \text{their } 0.9 \div 8$ or $4.95 \div 8$ or 0.61(875) or 0.62	M1dep	oe eg $0.68(75) \times 0.9$ or $0.68(75) - 0.06(875)$ shop D
	$13 \div 20$ or 0.65	M1	oe shop F
	D with 0.61(875) or 0.62 and 0.65 seen	A1	oe
	Alternative method 3 Comparing the cost of 20 bottles		
	5.5×0.1 or 0.55 or $1 - 0.1$ or 0.9	M1	oe eg $5.5 \div 10$ discount or multiplier for shop D implied by $5.5 \times 2.5 \times 0.1$ or 1.375 or 4.95
	$(5.5 - \text{their } 0.55) \times 2.5$ or $5.5 \times \text{their } 0.9 \times 2.5$ or 4.95×2.5	M1dep	oe eg $16.5 \times \text{their } 0.9$ or $16.5 - 1.65$ shop D
	D with 12.37(5) or 12.38 (and 13) seen	A2	A1 12.37(5) or 12.38 oe

Question 5(b) continues on the next page

5(b) cont	Additional Guidance																		
	Up to 3 marks may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts																		
	Use the scheme that favours the student eg 0.62 and 0.65 followed by 24.8(0) and 26(.00) and D (mark by Alt 2)				M3A1														
	All schemes can be oe in pence and allow work in a mix of pounds or pence for up to 3 marks																		
	Condone eg answer 24.75 with 26 seen				M3A1														
	For 0.1×5.5 , accept $10\% \times 5.5$ but do not accept 10% of 5.5 unless recovered																		
	Allow variations eg Shop D £27.5(0), Shop F £26, Shop D is £1.50 more but the discount is £2.75 Shop D cheaper				M1 M1M1 A1														
	Where the student compares eg 2, 4, 5, 10 or 80 bottles apply the principles of Alt 2 – some relevant figures given below (after offer)																		
<table><tr><td>Shop</td><td>Cost of 2</td><td>Cost of 4</td><td>Cost of 5</td><td>Cost of 80</td></tr><tr><td>D</td><td>1.23(75) or 1.24</td><td>2.47(5) or 2.48</td><td>3.09(375)</td><td>49.5(0)</td></tr><tr><td>F</td><td>1.3(0)</td><td>2.6(0)</td><td>3.25</td><td>52(.00)</td></tr></table>					Shop	Cost of 2	Cost of 4	Cost of 5	Cost of 80	D	1.23(75) or 1.24	2.47(5) or 2.48	3.09(375)	49.5(0)	F	1.3(0)	2.6(0)	3.25	52(.00)
Shop	Cost of 2	Cost of 4	Cost of 5	Cost of 80															
D	1.23(75) or 1.24	2.47(5) or 2.48	3.09(375)	49.5(0)															
F	1.3(0)	2.6(0)	3.25	52(.00)															

Q	Answer	Mark	Comments
6	All five extra sets ie WY or YW but not both and WZ or ZW but not both and XY or YX but not both and XZ or ZX but not both and YZ or ZY but not both	B2	list in any order B1 any three or four of the five correct
	Additional Guidance		
	Mark the grid unless blank		
	Ignore extras, repeats and reversals for B1 but not for B2		

Q	Answer	Mark	Comments
7(a)	Two even and two odd numbers and the numbers all different and the sum of the four numbers is 38	B2	any order B1 two even and two odd numbers and the sum of the four numbers is 38 or the numbers all different and the sum of the four numbers is 38 or two even and two odd numbers and the numbers all different and the sum of the four numbers is [28, 48]
	Additional Guidance		
	8 + 10 + 9 + 11	B2	
	20 + 8 + 5 + 5 (not all different)	B1	
	8 + 10 + 14 + 6 (no odds)	B1	
	20 + 8 + 13 + 7 (not 38 but in range)	B1	
	11 + 8 + 11 + 12 (not all different and not 38)	B0	
	5 + 7 + 11 + 17 (no evens and not 38)	B0	
	Negatives are acceptable for B1 or B2		
	0 is an even number for B1 or B2, but a blank box does not imply 0		
	Fractions and/or decimals are acceptable for four different numbers that sum to 38 for B1		
	Mark the boxes		

Q	Answer	Mark	Comments
7(b)	5 × 8 or 10 × 4	B2	either order B1 uses a factor of 24 and the product of the two numbers is [32, 48] or uses a factor of 50 and the product of the two numbers is [32, 48] or the product of the two numbers is 40
	Additional Guidance		
	8 × 6		B1
	7 × 5		B1
	40 × 1		B1
	2 × 20		B1
	Fractions and/or decimals are acceptable for non-factors for B1		
	Mark the boxes		

Q	Answer	Mark	Comments
7(c)	64 ÷ 2	B2	B1 any square number > 1 or any prime number
	Additional Guidance		
	Allow squares to be written in index form for B2 or B1 eg		
	8² ÷ 2		B2
	2 ÷ 64		B1
	÷ 9		B1
	128 ÷ 4		B1
	Mark the boxes		

Q	Answer	Mark	Comments
8(a)	39 in No (Played)	B1	
	27 in No (Two or more games played?)	B1	
	9 in Yes (Two or more games played?)	B1ft	ft 36 – their 27 their 27 must be a positive integer less than 36
	Additional Guidance		
	Mark the frequency tree		
	<pre> graph LR 75((75)) --- 36((36)) 75 --- 39((39)) 36 --- 9((9)) 36 --- 27((27)) </pre>		B1B1B1
	<pre> graph LR 75((75)) --- 36((36)) 75 --- 39((39)) 36 --- 27((27)) 36 --- 9((9)) </pre>		B1B0B1ft

Q	Answer	Mark	Comments
8(b)	Alternative method 1		
	0.63×75 or $47.2(5)$ or 47.3	M1	oe
	48	A1	
	Alternative method 2		
	$\frac{47}{75} = 0.62(\dots)$ or $\frac{48}{75} = 0.64$	M1	other trials can be ignored
	48	A1	
	Additional Guidance		
	Answer only 48		M1A1
	$0.64 \times 75 = 48$ with answer 48 (without seeing 0.63×75 or $47.2(5)$ or 47.3)		M0A0
	For 0.63×75 , accept $63\% \times 75$ but do not accept 63% of 75 unless recovered		

Q	Answer	Mark	Comments
9(a)	9×2 or 18 or $16 \times (12 - 2)$ or 16×10 or 160	M1	oe
	178	A1	
	Additional Guidance		
	178.00(p)		M1A1
	178.0		M1A0

Q	Answer	Mark	Comments
9(b)	Alternative method 1 Works in min or hrs for 11 episodes and 1 episode		
	11×40 or 440 or $11 \times \frac{40}{60}$ or $\frac{440}{60}$	M1	oe eg $11 \times \frac{4}{6}$ or $\frac{44}{6}$ or $\frac{22}{3}$ or 7.3(...)
	$60 + 22$ or 82 or $\frac{82}{60}$ oe fraction or 1.3(6...)	M1	522 or 8.7 implies M1M1
	8 hours 42 minutes	A1	SC2 6 h 2 min
	Alternative method 2 Works in min or hrs for 11 episodes and converts to hrs and min		
	11×40 or 440 or $11 \times \frac{40}{60}$ or $\frac{440}{60}$	M1	oe eg $11 \times \frac{4}{6}$ or $\frac{44}{6}$ or $\frac{22}{3}$ or 7.3(...) implied by 7 h 20 min
	7 h 20 min	M1	ft conversion of their 440 to hours and minutes if their $440 > 60$ or their $\frac{440}{60}$ to hours and minutes if their $\frac{440}{60} > 1$
	8 hours 42 minutes	A1	SC2 6 h 2 min
	Additional Guidance		
	4 h 40 min + 1 h 22 min = 6 h 2 min		SC2

Q	Answer	Mark	Comments
10(a)	$1440 \div 3 (\times 2)$ or $480 (\times 2)$	M1	oe
	960	A1	
	Additional Guidance		
	$\frac{960}{1440}$ on answer line		M1A0
	Condone 960 out of 1440		M1A1
	For $0.66(\dots) \times 1440$, accept $66(\dots)\% \times 1440$ but do not accept $66(\dots)\%$ of 1440 unless recovered		

Q	Answer	Mark	Comments
10(b)	$\frac{7}{11}$	B1	oe fraction
	Additional Guidance		
	Conversion to decimal or percentage		B0

Q	Answer	Mark	Comments
10(c)	$114 \div 150 (\times 100)$ or 0.76	M1	oe
	76	A1	SC1 24
	Additional Guidance		
	Build-up methods must be correct or show correct method for each step		

Q	Answer	Mark	Comments
11(a)	5 in H only	B1	
	10 in (M U H)'	B1ft	ft 15 – their 5 their 5 must be < 15
	Additional Guidance		
	11 in H only 10 in (M U H)'		B0 B1
	11 in H only 4 in (M U H)'		B0 B1ft

Q	Answer	Mark	Comments
11(b)	$\frac{6}{60}$ or $\frac{1}{10}$ or 0.1 or 10%	B1	oe fraction
	Additional Guidance		
	Ignore conversion attempt to decimal, fraction or percentage (but not ratio) after correct probability seen		
	Do not allow eg 6 in 60 or 6 out of 60 unless the correct probability seen		
	Do not allow ratio		
	Ignore words if correct probability seen		

Q	Answer	Mark	Comments
11(c)	Valid explanation	B1	eg needs brackets around $45 - 17$
	Additional Guidance		
	Any calculations shown must be correct		
	Ignore irrelevant, non-contradictory statements		
	It gives 40.75 and it should be 7	B1	
	(It gives the wrong answer,) it should be 7	B1	
	He shouldn't divide (by 4) first	B1	
	He needs brackets around the takeaway	B1	
	He needs to subtract first	B1	
	He should do $45 - 17$ and then divide by 4	B1	
	$(45 - 17) \div 4$ (may correct the given calculation by adding brackets)	B1	
	$\frac{45 - 17}{4}$ (implies the brackets)	B1	
	This gives 40.75 (or 163) when he needs 7 or 28	B1	
	$45 - 17 = 28$ $28 \div 4 = 7$ (needs to say that this is what he should do)	B0	
	This gives 40.75 (or 163) which is too much (needs to compare with 7 or 28)	B0	
	He hasn't used BIDMAS	B0	
	It gives the wrong answer	B0	
	$45 - 17 \div 4 = 7$	B0	
	$45 - 17 \div 4 = 40.75$	B0	
	He needs brackets	B0	

Q	Answer	Mark	Comments	
12	Ticks Both of them and gives valid reason for Sune eg references both values being divided (or multiplied) by 3 and gives valid reason for Peter eg references both values being divided (or multiplied) by 5	B2	oe valid reason eg1 $6 \div 2 \times 5 = 15$ and $6 \div 1.2 \times 3 = 15$ or eg2 $6 \div 15 = 0.4$ and $2 \div 5 = 0.4$ and $1.2 \div 3 = 0.4$ B1 ticks Sune only and gives valid reason for Sune or ticks Peter only and gives valid reason for Peter or ticks Both of them and gives valid reason for Sune or Peter	
	Additional Guidance			
	Accept a build-up method to imply multiplying by 3 or by 6 eg all three of 2 : 5 and 4 : 10 and 6 : 15 or all five of 1.2 : 3 and 2.4 : 6 and 3.6 : 9 and 4.8 : 12 and 6 : 15			
	Condone eg $2 : 5 \times 3 = 6 : 15$ to imply both values are multiplied by 3			
	2 is a factor of 6 and 5 is a factor of 15 (with no reference to $\times 3$)		B0	
	$6 : 15 = 2 : 5$ or $\frac{6}{15} = \frac{2}{5}$ (not evaluated to 0.4 or shown $\div 3$)		B0	
	6 : 15 simplifies to 2 : 5 and 1.2 : 3 (with no reference to $\div 3$ or $\div 5$)		B0	
	2 : 5 and 1.2 : 3 are both equivalent to 6 : 15 (with no reference to $\times 3$ or $\times 5$)		B0	