

**GCSE
MATHEMATICS
8300/1F**

Foundation Tier

Paper 1 Non-Calculator

Shadow paper based on June 2023 paper

Mark scheme

June 2023

Second Half

Version: 1.0

Q	Answer	Mark	Comments
17	Alternative method 1 – numerical		
	1 and 6 and 3 or 10 (parts) or numbers in the ratio 1 : 6 : 3 or (angle sum on a straight line =) 180	M1	oe may be seen in a ratio eg $\frac{1}{6}:1:\frac{3}{6}$ or $\frac{1}{3}:2:1$ numbers can be in any order eg 30, 10, 60
	$180 \div (1 + 6 + 3)$ or 18 or $180 \times \frac{3}{10}$	M1dep	oe
	54	A1	
	Alternative method 2 – algebraic		
	x and $6x$ and $3x$ or $10x$ or (angle sum on a straight line =) 180	M1	oe correct terms with any angle as x any letter, any order may be seen on diagram
	Correct equation with correct method to solve for one angle	M1dep	eg $x + 6x + 3x = 180$ and $180 \div (1 + 6 + 3)$
	54	A1	
	Additional Guidance		
	$x + 6x + 3x = 360$ or $360 \div 10$	M1M0A0	
	$\frac{1}{6}x + x + \frac{3}{6}x = 180$ and $180 \div \left(\frac{1}{6} + 1 + \frac{3}{6}\right)$	M1M1	
	$\frac{1}{3}x + \frac{6}{3}x + x = 180$ and $180 \div \left(\frac{1}{3} + \frac{6}{3} + 1\right)$	M1M1	
	Angle DBC marked as 54 on the diagram with answer line blank	M1M1A1	
	18 and 54 in working with no or incorrect answer chosen	M1M1A0	

Q	Answer	Mark	Comments
18	All conditions met: • first number is prime • second number is prime • correctly evaluated • even answer • answer in range	B3	if their product is incorrectly evaluated or missing, then ‘even answer’ and ‘answer in range’ refer to the correct product for their multiplication
	B2 4 conditions met B1 3 conditions met		
	Additional Guidance		
	2 × 23 = 46 (or 23 × 2 = 46) is the only fully correct solution		B3
	Allow 40 to 50 inclusive for ‘answer in range’		
	Award the best mark from boxes or in working for up to B2		
The two prime numbers do not have to be different			

Q	Answer	Mark	Comments
19	$\frac{3}{4} \times 72$ or 54	M1	oe eg $72 \div 4 \times 3$ implied by 126
	$\frac{1}{6} \times$ their 54 or 9	M1dep	oe eg $54 \div 6$ accept 0.16 or better for $\frac{1}{6}$
	$\frac{4}{9} \times 72$ or 32	M1	oe eg $72 \div 9 \times 4$ accept 0.44 or better for $\frac{4}{9}$
	41(.00)	A1	SC2 [54.65, 54.67] or 36 condone incorrect money notation eg 41.0 or 41.00p
	Additional Guidance		
	SC2 for [54.65, 54.67] is from misreading as Chloe gets £72		
	SC2 for 36 is from $\frac{4}{9}$ of 54 plus $\frac{1}{6}$ of 72		
	Do not accept ' $\frac{3}{4}$ of 72' or ' $\frac{1}{6}$ of 54' or ' $\frac{4}{9}$ of 72' for M marks unless accompanied by a correct method or value		

Q	Answer	Mark	Comments
20(a)	Strong positive	B1	

Q	Answer	Mark	Comments
20(b)	Straight line of best fit passing through (5, [18k, 24k]) and (25, [42k, 50k])	B1	mark intention of straight line ignore anything beyond gates
	Correct reading $\pm \frac{1}{2}$ square for their straight line of best fit	B1ft	ft their straight line with positive gradient ignore any working lines on the graph condone thousands missing may be implied by correct number of lives for their line
	Correct evaluation of their answer in thousands divided by 500	B1ft	ft their reading from straight line but must be in thousands condone half a life (or rounded or truncated) if reading is an odd number of thousands
	Additional Guidance		
	(their correct line of best fit would give a reading of 28 000) Answer 56 Answer 0.056		B1B1B1 B1B1B0
	For two lines of best fit with no answer, take as choice		

Q	Answer	Mark	Comments
21	Alternative method 1 – evaluation and division		
	$(3^2 =) 9$ or $(5 \times 3^2 =) 45$ or $360 \div 5$ or 72 or $360 \div 3^2$ or 40	M1	oe oe eg $5 \times 72 = 360$ oe eg $9 \times 40 = 360$
	$360 \div 5 \div 3^2$ or 8	M1dep	oe eg $8 \times 45 = 360$
	3 with M1 awarded and not from incorrect working	A1	
	Alternative method 2 – product of prime factors		
	360 written as a product of factors where at least one factor is prime	M1	eg 2 and 180 or 3 and 120 or 2 and 2 and 90 may be seen on a factor tree or in repeated division allow one strand to be incorrect if a previous value completes the product eg 10×36 followed by $2 \times 5 \times 6 \times 8$ implies $2 \times 5 \times 36$ for M1
	2 and 2 and 2 and 3 and 3 and 5	M1dep	may be seen on a factor tree or in repeated division
	3 with M1 awarded and not from incorrect working	A1	
	Additional Guidance		
	$8 \times 9 \times 5 = 360$ and answer 3	M1M1A1	
	2^3 on answer line with M2 awarded	M1M1A0	
	Answer 3 on answer line with no working	M0M0A0	
	Do not allow $360 \div 5 \times 3^2$ for M2 in alt 1 unless recovered, but do allow $\frac{360}{5 \times 3^2}$ or $360 \div (5 \times 3^2)$		

Q	Answer	Mark	Comments
22	$7x + 18$	B2	B1 $10x + 12$ or $-3x + 6$ or $7x + a$ or $bx + 18$, where a and b can be any numbers
	Additional Guidance		
	Do not ignore further working for B2 eg $7x + 18 = 25x$ eg $7x + 18, x = \frac{18}{7}$		B1 B1

Q	Answer	Mark	Comments
23	Any two from: Reference to graph passing through point where $x = 0$ Reference to graph being incorrect for negative x values Reference to the graph stopping before the end of the axes/axis	B2	B1 any one correct reference eg the graph touches the y -axis eg the graph to the left of the y -axis should be below the x -axis eg the graph should go to the ends of the axes
	Additional Guidance		
	Ignore non-contradictory, irrelevant responses alongside a correct response		
	Draws correct graph		B2
	Draws graph with one section correct for positive values of x or negative values of x		B1 for that section
	'It isn't the graph of $y = \frac{1}{x}$ ', scores B0, but B1 may still be scored for the other criticism		
	'There are no numbers on the axes' scores B0, but B1 may still be scored for the other criticism		
	Mark for graph touching y-axis		
	You cannot have $x = 0$		B1
	The line in the top right should be moved to the right		B1
	It says x doesn't $= 0$ but it (the sketch) does		B1
	One line is touching the y -axis		B1
	The lines should be symmetrical		B0
	You cannot have $y = 0$		B0
	One line is touching the y -axis but the other isn't		B0

Question 23 Additional Guidance continues on the next page

23 cont	Mark for negative values being in the wrong quadrant	
	There shouldn't be anything in the top-left section	B1
	There should be something in the bottom-left section	B1
	It is the graph of $y = \frac{1}{x^2}$	B1
	It should have rotational symmetry	B1
	It should be symmetrical about $y = x$	B1
	It should be symmetrical about $y = -x$	B1
	It should be symmetrical	B0
	One should be negative	B0
	The bit on the left is wrong	B0
	The negative values are plotted incorrectly	B0
	Reference to the graph stopping before the end of the axes	
	It stops before the end of the axes	B1
	The lines don't go far enough	B1
	The lines need to be higher up	B0

Q	Answer	Mark	Comments
24	Alternative method 1 – algebra based on Wenjie’s age		
	35×3 or 105	M1	may be implied by their algebraic total of the three ages being divided by 3
	$x + 5$ or $3x$ or $5x + 5$	M1	oe expressions any letter throughout
	$x + \text{their } (x + 5) + \text{their } 3x = \text{their } 105$ or $5x + 5 = \text{their } 105$	M1dep	oe equation, eg $\frac{x + x + 5 + 3x}{3} = 35$ dep on M1M1
	$(x =) 20$	M1dep	correct solution to their equation if the solution has a decimal part allow truncation or rounding to the nearest whole number
	60	A1	
	Alternative method 2 – algebra based on Conor’s age		
	35×3 or 105	M1	may be implied by their algebraic total of the three ages being divided by 3
	$\frac{y}{3}$ or $\frac{y}{3} + 5$ or $\frac{5y}{3} + 5$	M1	oe expressions any letter throughout
	$y + \text{their } \frac{y}{3} + \text{their } \left(\frac{y}{3} + 5\right) = \text{their } 105$	M1dep	oe equation eg $\frac{y + \frac{y}{3} + \frac{y}{3} + 5}{3} = 35$ dep on M1M1
	$3y + \text{their } y + \text{their } (y + 15) = 3 \times \text{their } 105$ or $5y + 15 = 315$ or $5y = 300$	M1dep	their equation with no denominator
	60	A1	

Question 24 continues on the next page

24 cont	Alternative method 3 – trial and improvement		
	35×3 or 105	M1	may be implied by their total of the three ages being divided by 3
	Trial of three numbers which fit the criteria, with either their sum correctly evaluated or their sum divided by 3	M1	eg $1 + 6 + 3 = 10$ or $(1 + 6 + 3) \div 3$ condone missing brackets
	Second trial of three numbers which fit the criteria, with either their sum correctly evaluated or their sum divided by 3	M1dep	dep on previous M1 eg $2 + 7 + 6 = 15$ or $(2 + 7 + 6) \div 3$ condone missing brackets
	20, 25 and 60 selected as their final combination	M1dep	any order implies M4
	60	A1	
	Additional Guidance		
	Up to M4 may be awarded for correct work seen in multiple attempts even if not subsequently used		
	Correct expressions, but the sum of the three ages is equated to 35 eg $5x + 5 = 35$		M0M1M0M0A0
	In alt 1, the correct value of x or the correct age for Conor for their two terms for Megan and Conor, with one correct, implies the first 4 marks eg x and $x - 5$ and $3x$, with $x = 22$ or answer 66		M1M1M1M1A0
	In alt 2, the correct value of y for their two terms for Wenjie and Megan, with one correct, implies the first 4 marks eg y and $\frac{y}{3}$ and $\left(\frac{y}{3} - 5\right)$, with $y = 66$ or answer 66		M1M1M1M1A0
	In alt 1 and alt 2, condone missing brackets in equations if not recovered for up to M1M1M1 eg $x + x + 5 + 3x \div 3 = 35$ not recovered		M1M1M1M0A0

Q	Answer	Mark	Comments
25	$\frac{13}{4}$	M1	oe improper fraction
	$\times \frac{5}{2}$ or $\times 2.5$ or 13×5 and 4×2 or $\frac{13 \times 5}{4 \times 5} \div \frac{2 \times 4}{5 \times 4}$ or $\frac{65}{20} \div \frac{8}{20}$	M1	oe if seen in a grid, must be selected
	$\frac{65}{8}$	A1	oe improper fraction
	$8\frac{1}{8}$	A1ft	oe mixed number ft their improper fraction correctly converted to a mixed number if at least M1 awarded
	Additional Guidance		
	Ignore attempts to simplify after mixed number seen		
	$\frac{15}{4} \times \frac{5}{2} = \frac{75}{8}$, answer $9\frac{3}{8}$		M0M1A0A1ft