Version 1.0

General Certificate of Secondary Education

Mathematics 4360

Unit 2 Higher Tier 43602H

Mark Scheme

Specimen Paper

Mark Schemes

Principal Examiners have prepared these mark schemes for specimen papers. These mark schemes have not, therefore, been through the normal process of standardising that would take place for live papers.

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Glossary for Mark Schemes

GCSE examinations are marked in such a way as to award positive achievement wherever possible. Thus, for GCSE Mathematics papers, marks are awarded under various categories.

M	Method marks are awarded for a correct method which could lead to a correct answer.
A	Accuracy marks are awarded when following on from a correct method. It is not necessary to always see the method. This can be implied.
B	Marks awarded independent of method.
Q	Marks awarded for quality of written communication.
M dep	A method mark dependent on a previous method mark being awarded.
ft	Follow through marks. Marks awarded following a mistake in an earlier step.
SC	Special case. Marks awarded within the scheme for a common misinterpretation which has some mathematical worth.
oe	Or equivalent. Accept answers that are equivalent. eg, accept 0.5 as well as $\frac{1}{2}$
eeoo	Each error or omission.

Unit 2 Higher Tier

Q	Answer	Mark	Comments
1	Sight of $\sqrt{100}$ or 10 and 20	M1	
	0.5	A1	oe (processed) eg, $\frac{1}{2}$
2	17.5 – 15 (= 2.5)	M1	
	Correct method for finding 2.5% of 140	M1	eg, 1% = 140 ÷ 100 (= 1.4) Their 1.4 × 2 + their 1.4 ÷ 2
	3.50	Q1	Strand (i) Correct notation required Do not accept 3.5
	Alternate method		
	Correct method for finding 15% of 140	M1	eg, 10% = 140 ÷ 10 (= 14) Their 14 + their 14 ÷ 2
	Correct method for finding 17.5% of 140 and subtracts	M1	Their 15% + (their 14 ÷ 2) ÷ 2
	3.50	Q1	Strand (i) Correct notation required Do not accept 3.5
3(a)	2000 × 12 ÷ 50 × 5	M1	oe
	2400	A1	
3(b)	(12 × 2000) × (0.)10 (= 2400 or 240 000)	M1	Annual other running cost
	0.4 × 24 000 (= 9600)	M1	Annual income
	4800	A1 ft	Profit after deductions Their 9600 – their 2400 – their 2400
	4800 > 3000 so YES)	Q1	Strand (iii) Valid conclusion with working clearly shown

Q	Answer	Mark	Comments
4(a)	Either $\frac{5}{20}$ or $\frac{8}{20}$	M1	oe
	$\frac{13}{20}$	A1	oe
	$\frac{7}{20}$	A1 ft	
4(b)	$\frac{5}{8} \times 24$	M1	oe
	15	A1	
5(a)	m^8	B1	
5(b)	m^{-2}	B1	or $\frac{1}{m^2}$
5(c)	$\frac{a}{2}$	B2	B1 $\sqrt{\frac{a^2}{4}}$ seen or implied by cancelling common factors
6(a)	37	B1	
6(b)	$16 + a$	B1	$(127 - a) \div 2$
	2 × their $(16 + a) + a$	M1	$32 + 3a$, $2(16 + a) + a$
	2 × their $(32 + 3a) + a = 127$	M1	oe $64 + 7a = 127$
	$(a =)$ 9	A1	
6(b)	**Alternate method**		
	Evidence of multiplying 8 by 2 and adding any number	M1	Evidence of subtracting a number from 127 and dividing by 2
	Evidence of multiplying their answer by 2 and adding **the same** number	M1	Evidence of subtracting the same number from their answer and dividing by 2
	Refined attempt	M1	
	$(a =)$ 9	A1	

Q	Answer	Mark	Comments
7(a)	$C = 10d + 5$	B1	
7(b)	Correct substitution of a value for d in formula	M1	20, 25, 30
	Identifies equal pay at $d = 2$	M1 dep	
	No and cheaper at $d > 2$	A1	oe
	Alternate method		
	Plots at least two correct coordinates on graph for mountain bike	M1	(0, 15) (1, 20) (2, 25) (3, 30)
	Correct line at least as far as intersection at (2, 25)	M1 dep	
	No and cheaper at $d > 2$	A1	
8(a)	$(12 - 4) \times 2$ (= 16)	M1	oe
	$(16 - 4) \times 2$ (= 24) and $(24 - 4) \times 2$ (= 40)	A1	oe
8(b)	$12 \div 2 + 4$	M1	or (40,) 24, 16, 12, 10(, 9)
	10 or 9	A1	
9(a)	$4x(3x^2 - 2yz)$	B2	B1 One correct factor eg, $4(3x^3 - 2xyz)$ or $x(12x^2 - 8yz)$
9(b)	$(x \pm 1)(x \pm 2)$	M1	
	$(x + 1)(x + 2)$	A1	
9(c)	$\frac{1}{3}$	B1	
9(d)	$10(x^2 - 4y^2)$	M1	
	$10(x + 2y)(x - 2y)$	A2	A1 For both $\pm 2y$ or $10(x + 4y)(x - y)$

Q	Answer	Mark	Comments
10	$2a + 3c = 69$ $3a + 5c = 109$	B2	B1 One equation correct Any letters may be used but need to be consistent for B2
	× 1st by 3 or 5 × 2nd by 2 or 3	M1	oe (to obtain consistent coefficients)
	Two equations (max one error) and subtraction	M1 dep	eg, $6a + 9c = 207$ $6a + 10c = 218$ and subtraction
	Adult (a =) 18 Child (c =) 11	A1	
11	**See next page**		
12(a)	$3x - x > 8 - 7$	M1	
	$x > \frac{1}{2}$	A1	oe
12(b)	$a + 3 = b^2$	M1	
	$a = b^2 - 3$	A1	
13	$(2n + 2)^2 - (2n)^2$	M1	
	$4n^2 + 8n + 4 - 4n^2$)	M1 dep	
	$8n + 4$	A1	
	$8n + 4 = 2(2n + 2 + 2n)$ or $2(2n + 2 + 2n) = 8n + 4$	A1	
	Alternate method		
	Let n be even $(n + 2)^2 - n^2$	M1	
	$n^2 + 4n + 4 - n^2$	M1 dep	
	$4n + 4$	A1	
	$2(n + n + 2) = 2(2n + 2) = 4n + 4$ or $4n + 4 = 2(2n + 2) = 2(n + n + 2)$	A1	

Q	Answer	Mark	Comments
11(a)	$81 + 9\sqrt{7} + 9\sqrt{7} + \sqrt{7}\ \sqrt{7}$ or better	M1	4 terms and any 3 correct
	$88 + 18\sqrt{7}$	A1	$a = 88 \quad b = 18$
11(b)	$\frac{(\sqrt{12}+6)\sqrt{3}}{\sqrt{3}\sqrt{3}}$	M1	
	$\frac{\sqrt{36}+6\sqrt{3}}{3}$	A1	$\frac{6+6\sqrt{3}}{3}$
	$= 2 + 2\sqrt{3}$	M1	
	$= 2(1 + \sqrt{3})$	Q1	Strand (ii) Correct answer with a logical argument showing key steps
	Alternate method 1		
	$\frac{\sqrt{12}}{\sqrt{3}} + \frac{6}{\sqrt{3}}$	M1	
	$\sqrt{4} + \frac{6\sqrt{3}}{\sqrt{3}\sqrt{3}}$	A1	
	$= 2 + 2\sqrt{3}$	M1	
	$= 2(1 + \sqrt{3})$	Q1	Strand (ii) Correct answer with a logical argument showing key steps
	Alternate method 2		
	$\sqrt{12} + 6 = 2\sqrt{3}\ (1 + \sqrt{3})$	M1	
	$= 2\sqrt{3} + 2 \times 3$	A1	
	$= \sqrt{4}\ \sqrt{3} + 6$	M1	
	$12 + \sqrt{6}$	Q0	Note: This is not a full proof

Q	Answer	Mark	Comments
14	Sight of $10x$ or $-3(2x-1)$ or $3x(2x-1)$	M1	
	$-6x+3$ or $6x^2-3x$	M1 dep	
	$6x^2-7x-3\ (=0)$	A1	
	$(2x-3)(3x+1)\ (=0)$	M1	
	$x=1.5$ or $-\frac{1}{3}$	A1	
	Full answer with stages clearly shown	Q1	Strand (ii)