NON-CALC J · MARK SCHEME

GCSE Mathematics · Higher Tier

40 marks · 45 minutes · Non-calculator

M method **A** accuracy (depends on M) **B** independent **P** process **C** communication

oe or equivalent cao correct answer only ft follow through Accept any correct, fully justified method.

Question 1

Error interval · N15 · Number · AO1 · 2 marks

QN	ANSWER	MARK	GUIDANCE
1	$12.65 \leqslant t < 12.75$	B1	For 12.65 and 12.75 seen as the ends of an interval
		B1	For a fully correct interval, with $\leqslant$ and $<$

Question 2

Reverse percentage · R9 · Ratio & proportion · AO3 · 4 marks

QN	ANSWER	MARK	GUIDANCE
2	£54	P1	For $336 \div 1.12$ oe
		P1	For the old price of the adult ticket £300, or the increase on the adult ticket £36
		P1	For 0.12×150 $(= 18)$ oe
		A1	cao

Question 3

Complete a histogram · S3 · Statistics · AO1 · 3 marks

QN	ANSWER	MARK	GUIDANCE
3(a)	14 and 18	B1	For both frequencies correct
3(b)	Two bars	B1	For a bar for $15 < h \leqslant 20$ at height 3
		B1	For a bar for $30 < h \leqslant 50$ at height 0.4

Question 4

Solve by factorising · A18 · Algebra · AO1 · 3 marks

QN	ANSWER	MARK	GUIDANCE
4	$x = \frac{3}{2}, x = -4$	M1	For $(2x \pm 3)(x \pm 4)$
		M1	For $(2x - 3)(x + 4) = 0$
		A1	For both values

Question 5

Direct proportion · R10 · Ratio & proportion · AO1 · 3 marks

QN	ANSWER	MARK	GUIDANCE
5(a)	$E = 0.15M$	M1	For $12 = k \times 80$
		A1	For $E = 0.15M$ or $E = \frac{3}{20}M$ oe
5(b)	180 g	B1	ft their formula from part (a)

Question 6

Counting strategies · N5 · Number · AO3 · 2 marks

QN	ANSWER	MARK	GUIDANCE
6	126	P1	For one correct case, e.g. first digit 6 or 8: $2 \times 3 \times 7$ $(= 42)$, or first digit 5, 7 or 9: $3 \times 4 \times 7$ $(= 84)$
		A1	cao

Question 7

Alternate segment · G10 · Geometry & measures · AO2 · 3 marks

QN	ANSWER	MARK	GUIDANCE
7	76°	B1	For angle $ABC = 52°$ or angle $BAC = 52°$
		B1	For angle $PAB = 76°$
		C1	For all reasons: the alternate segment theorem; base angles of an isosceles triangle are equal; angles on a straight line add up to 180°

Question 8

Fractional enlargement · G7 · Geometry & measures · AO1 · 2 marks

QN	ANSWER	MARK	GUIDANCE
8	**Vertices** $(3,5)$, $(6,5)$, $(6,3)$, $(4,3)$	B2	For a fully correct enlargement (B1 for the correct size and orientation in the wrong position, or for 3 vertices correct)

Question 9

Inverse functions · A7 · Algebra · AO1 · AO3 · 4 marks

QN	ANSWER	MARK	GUIDANCE
9(a)	$\frac{5x-3}{2}$	M1	For $5y = 2x + 3$, or $x = \frac{2y+3}{5}$ rearranged by one step
		A1	oe
9(b)	$x = 1$	P1	For $\frac{2x+3}{5} = \frac{5x-3}{2}$ leading to $4x + 6 = 25x - 15$
		A1	cao

Question 10

Rationalising surds · N8 · Number · AO2 · 2 marks

QN	ANSWER	MARK	GUIDANCE
10	**Shown**	M1	For $\frac{18\sqrt{6}}{6} = 3\sqrt{6}$ or $\sqrt{24} = 2\sqrt{6}$
		C1	For $3\sqrt{6} - 2\sqrt{6} = \sqrt{6}$ with all working shown

Question 11

Line meets a circle · A19 · A16 · Algebra · AO2 · AO1 · 5 marks

QN	ANSWER	MARK	GUIDANCE
11(a)	**Shown**	M1	For substituting, $x^2 + (2x - 1)^2 = 34$
		C1	For $x^2 + 4x^2 - 4x + 1 = 34$ leading to $5x^2 - 4x - 33 = 0$
11(b)	$(3,\ 5)$ **and** $(-2.2,\ -5.4)$	M1	For $(x - 3)(5x + 11) = 0$, or a correct use of the quadratic formula
		A1	For $x = 3$ and $x = -2.2$
		A1	For both pairs of coordinates

Question 12

Geometric proof · G6 · Geometry & measures · AO2 · 3 marks

QN	ANSWER	MARK	GUIDANCE
12	**Proof**	M1	For angle MPQ = angle MQP $(= a)$ and angle MRQ = angle MQR $(= b)$, as base angles of isosceles triangles are equal
		M1	For $a + a + b + b = 180$, as angles in triangle PQR add up to 180°
		C1	For $a + b = 90$, so angle $PQR = 90°$

Question 13

Probability with algebra · P8 · P9 · Probability · AO3 · 4 marks

QN	ANSWER	MARK	GUIDANCE
13	16	P1	For $\frac{r}{2r+4} \times \frac{r-1}{2r+3}$, where there are r red counters
		P1	For $8r(r-1) = (2r+4)(2r+3)$ leading to $2r^2 - 11r - 6 = 0$ oe
		P1	For $(2r+1)(r-6) = 0$, so $r = 6$
		A1	cao

Paper overview

Q	TOPIC	SPEC REF	STRAND	AO	MARKS
1	Error interval	N15	Number	AO1	2
2	Reverse percentage	R9	Ratio & proportion	AO3	4
3	Complete a histogram	S3	Statistics	AO1	3
4	Solve by factorising	A18	Algebra	AO1	3
5	Direct proportion	R10	Ratio & proportion	AO1	3
6	Counting strategies	N5	Number	AO3	2
7	Alternate segment	G10	Geometry & measures	AO2	3
8	Fractional enlargement	G7	Geometry & measures	AO1	2
9	Inverse functions	A7	Algebra	AO1 · AO3	4
10	Rationalising surds	N8	Number	AO2	2
11	Line meets a circle	A19 · A16	Algebra	AO2 · AO1	5
12	Geometric proof	G6	Geometry & measures	AO2	3
13	Probability with algebra	P8 · P9	Probability	AO3	4
Total					**40**

Marks by strand

Number	**6 marks (15%)**
Algebra	**12 marks (30%)**
Ratio & proportion	**7 marks (18%)**
Geometry & measures	**8 marks (20%)**
Probability	**4 marks (10%)**
Statistics	**3 marks (8%)**

Marks by assessment objective

AO1 Standard techniques	**18 marks (45%)**
AO2 Reasoning	**10 marks (25%)**
AO3 Problem solving	**12 marks (30%)**