NON-CALC G · 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

Standard form · N9 · Number · AO2 · AO1 · 3 marks

QN	ANSWER	MARK	GUIDANCE
1(a)	**Explanation**	C1	For e.g. 10^{-2} is greater than 10^{-3}, or $4.5 \times 10^{-3} = 0.0045$ and $3 \times 10^{-2} = 0.03$, and $0.0045 < 0.03$
1(b)	1.26×10^4	M1	For 12.6×10^3, or 12 600, or $4.2 \times 3 = 12.6$ and $10^5 \times 10^{-2} = 10^3$
		A1	cao

Question 2

Best buy · R6 · R7 · Ratio & proportion · AO2 · 3 marks

QN	ANSWER	MARK	GUIDANCE
2	**Large box, with correct comparison**	M1	For a correct method for one box, e.g. $180 \div 250$ (= 0.72p per g) or $\$1.80 \div 2.5$ (= $\$0.72$ per 100 g)
		M1	For a correct method for the other box, e.g. $272 \div 400$ (= 0.68p per g), or comparing the cost of 2000 g: £14.40 and £13.60
		C1	For correct values and the conclusion that the large box is better value

Question 3

Two-way tables · P6 · Probability · AO1 · AO3 · 3 marks

QN	ANSWER	MARK	GUIDANCE
3(a)	**Adults: 18, 24, 8, 50** **Children: 2, 4, 24, 30** **Total: 20, 28, 32, 80**	B1	For at least 4 correct entries in the body of the table
		B1	For a fully correct table
3(b)	$\frac{24}{32}$	P1	For $\frac{24}{32}$ oe, e.g. $\frac{3}{4}$, ft their table (children choosing hot chocolate $\div$ 32)

Question 4

Substitution · A2 · Algebra · AO1 · 2 marks

QN	ANSWER	MARK	GUIDANCE
4	**88**	M1	For $3 \times (-4)^2$ $(= 48)$ or $-2 \times (-4) \times 5$ $(= 40)$
		A1	cao

Question 5

Volume of a prism · G16 · Geometry & measures · AO3 · 3 marks

QN	ANSWER	MARK	GUIDANCE
5	**15 cm**	P1	For the area of the trapezium $\frac{1}{2}(5+9) \times 4$ $(= 28)$
		P1	For $420 \div 28$
		A1	cao

Question 6

Linear sequences · A25 · Algebra · AO1 · AO2 · 4 marks

QN	ANSWER	MARK	GUIDANCE
6(a)	$5n - 2$	M1	For $5n + k$ with $k \neq -2$
		A1	For $5n - 2$ oe
6(b)	**Shown**	M1	For $5n - 2 = 43 - 3n$ (ft their (a)) leading to $8n = 45$
		C1	For $n = 5.625$ (or $\frac{45}{8}$), which is not a whole number, so no term position is the same

Question 7

Isosceles angles · G3 · A17 · Geometry & measures · AO3 · 3 marks

QN	ANSWER	MARK	GUIDANCE
7	$66°$	P1	For angle $ACB = 180 - (5x + 44) = 136 - 5x$ (angles on a straight line), and angle ABC the same
		P1	For $3x + 6 + 2(136 - 5x) = 180$, leading to $x = 14$
		A1	For 66 ($= 136 - 5 \times 14$)

Question 8

Sketching a quadratic · A11 · A12 · Algebra · AO1 · 3 marks

QN	ANSWER	MARK	GUIDANCE
8	**U-shaped sketch**	B1	For a U-shaped curve crossing the x-axis at $(-2,\ 0)$ and $(4,\ 0)$
		B1	For crossing the y-axis at $(0,\ -8)$
		B1	For the turning point at $(1,\ -9)$, e.g. from $(x - 1)^2 - 9$ or symmetry

Question 9

Tree diagrams · P8 · Probability · AO1 · AO2 · 3 marks

QN	ANSWER	MARK	GUIDANCE
9(a)	Correct tree	B1	For 0.85 on the first "Not late" branch and 0.15, 0.85 on both pairs of Tuesday branches
9(b)	No, with 0.2775	M1	For $1 - 0.85 \times 0.85$, or $0.15 \times 0.15 + 0.15 \times 0.85 + 0.85 \times 0.15$
		C1	For 0.2775 and stating Zara is not correct (she has counted late on both days twice)

Question 10

Exponential growth · R16 · Ratio & proportion · AO3 · 3 marks

QN	ANSWER	MARK	GUIDANCE
10	1:40 pm	P1	For repeated doubling, e.g. 3000, 6000, 12 000, 24 000, ...
		P1	For 48 000 after 5 doublings (24 000 after 4 is not enough)
		A1	For 1:40 pm oe ($5 \times 20 = 100$ minutes after noon)

Question 11

Cyclic quadrilaterals · G10 · Geometry & measures · AO2 · 3 marks

QN	ANSWER	MARK	GUIDANCE
11	75°	B1	For angle $BCD = 106°$ or angle $BAD = 74°$
		B1	For angle $ABD = 75°$
		C1	For all reasons: angles on a straight line add up to 180°; opposite angles of a cyclic quadrilateral add up to 180°; angles in a triangle add up to 180°

Question 12

Equations with fractions · A18 · Algebra · AO1 · 4 marks

QN	ANSWER	MARK	GUIDANCE
12	$x = 6, x = -2$	M1	For multiplying through: $4(x-1)+3(x+4)=(x+4)(x-1)$
		M1	For a correct quadratic, e.g. $x^2-4x-12=0$
		M1	For $(x-6)(x+2)=0$, or a correct method to solve their 3-term quadratic
		A1	Both values correct

Question 13

Index equations · N7 · Number · AO3 · 3 marks

QN	ANSWER	MARK	GUIDANCE
13	$\frac{3}{2}$	P1	For writing in powers of 2, e.g. $2^{2x} \div 2^{1-x}$ or $8\sqrt{2}=2^{3.5}$
		P1	For $2x-(1-x)=\frac{7}{2}$ oe
		A1	For $\frac{3}{2}$ oe

Paper overview

Q	TOPIC	SPEC REF	STRAND	AO	MARKS
1	Standard form	N9	Number	AO2 · AO1	3
2	Best buy	R6 · R7	Ratio & proportion	AO2	3
3	Two-way tables	P6	Probability	AO1 · AO3	3
4	Substitution	A2	Algebra	AO1	2
5	Volume of a prism	G16	Geometry & measures	AO3	3
6	Linear sequences	A25	Algebra	AO1 · AO2	4
7	Isosceles angles	G3 · A17	Geometry & measures	AO3	3
8	Sketching a quadratic	A11 · A12	Algebra	AO1	3
9	Tree diagrams	P8	Probability	AO1 · AO2	3
10	Exponential growth	R16	Ratio & proportion	AO3	3
11	Cyclic quadrilaterals	G10	Geometry & measures	AO2	3
12	Equations with fractions	A18	Algebra	AO1	4
13	Index equations	N7	Number	AO3	3
Total					**40**

Marks by strand

Number	**6 marks (15%)**
Algebra	**13 marks (32%)**
Ratio & proportion	**6 marks (15%)**
Geometry & measures	**9 marks (22%)**
Probability	**6 marks (15%)**
Statistics	**0 marks (0%)**

Marks by assessment objective

AO1 Standard techniques	**16 marks (40%)**
AO2 Reasoning	**11 marks (28%)**
AO3 Problem solving	**13 marks (32%)**