NON-CALC A · 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

Prime factors and HCF · N4 · Number · AO1 · 3 marks

QN	ANSWER	MARK	GUIDANCE
1(a)	$2^2 \times 3^2 \times 7$	M1	For a correct method, e.g. a factor tree or repeated division with at least two correct steps
		A1	For $2 \times 2 \times 3 \times 3 \times 7$ or $2^2 \times 3^2 \times 7$
1(b)	12	B1	cao

Question 2

Ratio problem · R5 · Ratio & proportion · AO3 · 3 marks

QN	ANSWER	MARK	GUIDANCE
2	36	P1	For recognising $5 - 3 = 2$ parts $= 18$
		P1	For 1 part $= 9$ and 9×4
		A1	cao

Question 3

Mean from grouped data · S4 · Statistics · AO1 · AO2 · 4 marks

QN	ANSWER	MARK	GUIDANCE
3(a)	17.5 minutes	M1	For using midpoints 5, 15, 25, 35 with the frequencies, e.g. $20 + 135 + 125 + 70$
		M1	For $\sum fx \div 20$, i.e. $350 \div 20$
		A1	cao
3(b)	Explanation	C1	e.g. the exact times are not known, or midpoints have been used

Question 4

Expand and factorise · A4 · Algebra · AO1 · 4 marks

QN	ANSWER	MARK	GUIDANCE
4(a)	$2x^2 + 7x - 15$	M1	For 3 out of 4 terms correct in $2x^2 + 10x - 3x - 15$
		A1	cao
4(b)	$(x - 7)(x + 4)$	M1	For $(x \pm 7)(x \pm 4)$
		A1	cao

Question 5

Angles in polygons · G3 · Geometry & measures · AO3 · 3 marks

QN	ANSWER	MARK	GUIDANCE
5	16	P1	For exterior $+ 7 \times$ exterior $= 180$, or $180 \div 8$ $(= 22.5)$
		P1	For $360 \div 22.5$
		A1	cao

Question 6

Simultaneous equations · A19 · Algebra · AO1 · 3 marks

QN	ANSWER	MARK	GUIDANCE
6	$x = 2$, $y = -1$	M1	For a correct method to eliminate one variable, e.g. $19x = 38$ or $19y = -19$
		M1	For substituting their found value into one of the equations
		A1	Both values correct

Question 7

Combined probability · P8 · Probability · AO2 · 3 marks

QN	ANSWER	MARK	GUIDANCE
7	**No, with** $\frac{7}{15}$	M1	For $\frac{4}{10} \times \frac{3}{9}$ or $\frac{6}{10} \times \frac{5}{9}$
		M1	For $\frac{12}{90} + \frac{30}{90}$
		C1	For $\frac{7}{15}$ oe and stating Sam is not correct, as $\frac{7}{15} < \frac{1}{2}$

Question 8

Fractional indices · N7 · Number · AO1 · 2 marks

QN	ANSWER	MARK	GUIDANCE
8	$\frac{1}{16}$	M1	For $\sqrt[3]{64} = 4$, or $64^{\frac{2}{3}} = 16$, or the reciprocal shown
		A1	cao

Question 9

Area of a sector · G18 · Geometry & measures · AO1 · 2 marks

QN	ANSWER	MARK	GUIDANCE
9	12π **cm**^{2}	M1	For $\frac{120}{360} \times \pi \times 6^2$
		A1	cao

Question 10

Circle theorems · G10 · Geometry & measures · AO2 · 3 marks

QN	ANSWER	MARK	GUIDANCE
10	26°	B1	For angle $AOC = 128°$
		B1	For angle $OAC = 26°$
		C1	For both reasons: the angle at the centre is twice the angle at the circumference; base angles of an isosceles triangle are equal

Question 11

Perpendicular lines · A9 · Algebra · AO3 · 4 marks

QN	ANSWER	MARK	GUIDANCE
11	$y = \frac{1}{2}x + 3$	P1	For the gradient of **L** $= -2$
		P1	For the gradient of **M** $= \frac{1}{2}$
		P1	For substituting $(4,\ 5)$ into $y = \frac{1}{2}x + c$
		A1	oe

Question 12

Algebraic proof · A6 · Algebra · AO2 · 3 marks

QN	ANSWER	MARK	GUIDANCE
12	**Proof**	M1	For consecutive odd numbers written as, e.g., $2n + 1$ and $2n + 3$
		M1	For $(2n+3)^2 - (2n+1)^2 = 4n^2 + 12n + 9 - (4n^2 + 4n + 1)$
		C1	For $8n + 8 = 8(n + 1)$, so always a multiple of 8

Question 13

Similar solids · G19 · R12 · Ratio & proportion · AO3 · 3 marks

QN	ANSWER	MARK	GUIDANCE
13	**81 cm^3**	**P1**	For the length scale factor $\sqrt{\frac{50}{18}} = \frac{5}{3}$ (or $\frac{3}{5}$)
		P1	For $375 \div \left(\frac{5}{3}\right)^3$ or $375 \times \frac{27}{125}$
		A1	cao

Paper overview

Q	TOPIC	SPEC REF	STRAND	AO	MARKS
1	Prime factors and HCF	N4	Number	AO1	3
2	Ratio problem	R5	Ratio & proportion	AO3	3
3	Mean from grouped data	S4	Statistics	AO1 · AO2	4
4	Expand and factorise	A4	Algebra	AO1	4
5	Angles in polygons	G3	Geometry & measures	AO3	3
6	Simultaneous equations	A19	Algebra	AO1	3
7	Combined probability	P8	Probability	AO2	3
8	Fractional indices	N7	Number	AO1	2
9	Area of a sector	G18	Geometry & measures	AO1	2
10	Circle theorems	G10	Geometry & measures	AO2	3
11	Perpendicular lines	A9	Algebra	AO3	4
12	Algebraic proof	A6	Algebra	AO2	3
13	Similar solids	G19 · R12	Ratio & proportion	AO3	3
Total					**40**

Marks by strand

Number	**5 marks (12%)**
Algebra	**14 marks (35%)**
Ratio & proportion	**6 marks (15%)**
Geometry & measures	**8 marks (20%)**
Probability	**3 marks (8%)**
Statistics	**4 marks (10%)**

Marks by assessment objective

AO1 Standard techniques	**17 marks (42%)**
AO2 Reasoning	**10 marks (25%)**
AO3 Problem solving	**13 marks (32%)**