CALC B · MARK SCHEME

GCSE Mathematics · Higher Tier

40 marks · 45 minutes · 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

Rounding a calculation · N15 · Number · AO1 · 2 marks

QN	ANSWER	MARK	GUIDANCE
1(a)	15.36711292...	B1	For 15.36711292... (at least 15.367)
1(b)	15.4	B1	ft their answer to part (a)

Question 2

Exchange rates · R1 · Ratio & proportion · AO3 · 3 marks

QN	ANSWER	MARK	GUIDANCE
2	France	P1	For converting one price to a common currency, e.g. $172 \div 1.16 = \$148.28$
		P1	For converting the other price, e.g. $189 \div 1.27 = \$148.82$
		C1	For France, with correct comparable values for all three countries (£149, £148.28, £148.82 or equivalent in one currency)

Question 3

Mean from grouped data · S4 · Statistics · AO2 · 3 marks

QN	ANSWER	MARK	GUIDANCE
3	No, 2.25 kg	M1	For using midpoints with the frequencies, e.g. $3 + 16.5 + 32.5 + 24.5 + 13.5\ (= 90)$
		M1	For $\sum fx \div 40$
		C1	For 2.25 and stating Ella is not correct

Question 4

Standard form · N9 · Number · AO1 · 2 marks

QN	ANSWER	MARK	GUIDANCE
4	21.44 kg	M1	For $3.2 \times 10^7 \times 6.7 \times 10^{-4}$ $(= 21\,440$ g)
		A1	For 21.44 oe, accept 21.4

Question 5

Trapezium area expression · G16 · A21 · Algebra · AO1 · AO2 · 4 marks

QN	ANSWER	MARK	GUIDANCE
5(a)	Shown	M1	For $\frac{1}{2}(x + 4 + 3x - 2) \times x = 36$
		C1	For $(2x + 1)x = 36$ leading to $2x^2 + x - 36 = 0$
5(b)	10 cm	M1	For $(2x + 9)(x - 4) = 0$ or a correct use of the formula, giving $x = 4$
		A1	For $3x - 2 = 10$ cao

Question 6

Depreciation · R16 · Ratio & proportion · AO3 · 3 marks

QN	ANSWER	MARK	GUIDANCE
6	6 years	P1	For using the multiplier 0.88
		P1	For $18\,500 \times 0.88^5 = 9763.04$ and $18\,500 \times 0.88^6 = 8591.48$, or year-by-year values
		A1	cao

Question 7

Term-to-term sequences · A23 · Algebra · AO1 · 2 marks

QN	ANSWER	MARK	GUIDANCE
7	23	M1	For $u_2 = 8$ and $u_3 = 14$
		A1	cao

Question 8

Sector area and perimeter · G18 · Geometry & measures · AO3 · 3 marks

QN	ANSWER	MARK	GUIDANCE
8	**31.7 cm**	**P1**	For $\frac{75}{360} \times \pi r^2 = 60$, giving $r = 9.57\ldots$
		P1	For $\frac{75}{360} \times 2\pi \times 9.57\ldots + 2 \times 9.57\ldots$ (arc $= 12.53\ldots$)
		A1	Accept 31.6 to 31.7

Question 9

Sine rule · G22 · Geometry & measures · AO1 · 3 marks

QN	ANSWER	MARK	GUIDANCE
9	**11.5 cm**	**M1**	For angle $BAC = 180 - 57 - 52 = 71°$
		M1	For $\frac{BC}{\sin 71°} = \frac{9.6}{\sin 52°}$
		A1	For 11.5 (accept 11.51 to 11.52)

Question 10

Density of a mixture · R11 · Ratio & proportion · AO3 · 3 marks

QN	ANSWER	MARK	GUIDANCE
10	**1.11 g/cm^3**	**P1**	For the mass of juice $350 \times 1.05 = 367.5$ g or the volume of syrup $120 \div 1.33 = 90.2\ldots$ cm^3
		P1	For total mass ÷ total volume, $487.5 \div 440.2\ldots$
		A1	Accept 1.10 to 1.11

Question 11

Linear and quadratic · A19 · Algebra · AO1 · 4 marks

QN	ANSWER	MARK	GUIDANCE
11	$x = 2.87$, $y = 3.87$; $x = -0.87$, $y = 0.13$	M1	For $2x^2 - 3x - 4 = x + 1$
		M1	For $2x^2 - 4x - 5 = 0$ and a correct substitution into the formula
		A1	For $x = 2.87$ and $x = -0.87$
		A1	For $y = 3.87$ and $y = 0.13$, correctly paired

Question 12

Similar solids · G19 · Geometry & measures · AO2 · 3 marks

QN	ANSWER	MARK	GUIDANCE
12	**No, 22.5 cm**	M1	For the volume scale factor $\frac{2160}{640} = 3.375$
		M1	For the length scale factor $\sqrt[3]{3.375} = 1.5$
		C1	For 22.5 cm and stating Kim is not correct (she used the volume scale factor)

Question 13

Conditional probability · P9 · Probability · AO2 · 3 marks

QN	ANSWER	MARK	GUIDANCE
13(a)	**Explanation**	C1	For e.g. Mo has divided by everyone (80) instead of only the people who like coffee
13(b)	$\frac{12}{43}$	M1	For $12 + 31 = 43$
		A1	oe

Question 14

Gradient of a curve · A15 · R15 · Algebra · AO1 · 2 marks

QN	ANSWER	MARK	GUIDANCE
14	**4.6 cm/min**	**M1**	For a tangent drawn at $t = 3$ and its gradient found as the change in d divided by the change in t
		A1	For an answer in the range 3.8 to 5.4 (accept -3.8 to -5.4)

Paper overview

Q	TOPIC	SPEC REF	STRAND	AO	MARKS
1	Rounding a calculation	N15	Number	AO1	2
2	Exchange rates	R1	Ratio & proportion	AO3	3
3	Mean from grouped data	S4	Statistics	AO2	3
4	Standard form	N9	Number	AO1	2
5	Trapezium area expression	G16 · A21	Algebra	AO1 · AO2	4
6	Depreciation	R16	Ratio & proportion	AO3	3
7	Term-to-term sequences	A23	Algebra	AO1	2
8	Sector area and perimeter	G18	Geometry & measures	AO3	3
9	Sine rule	G22	Geometry & measures	AO1	3
10	Density of a mixture	R11	Ratio & proportion	AO3	3
11	Linear and quadratic	A19	Algebra	AO1	4
12	Similar solids	G19	Geometry & measures	AO2	3
13	Conditional probability	P9	Probability	AO2	3
14	Gradient of a curve	A15 · R15	Algebra	AO1	2
Total					**40**

Marks by strand

Number	**4 marks (10%)**
Algebra	**12 marks (30%)**
Ratio & proportion	**9 marks (22%)**
Geometry & measures	**9 marks (22%)**
Probability	**3 marks (8%)**
Statistics	**3 marks (8%)**

Marks by assessment objective

AO1 Standard techniques	**17 marks (42%)**
AO2 Reasoning	**11 marks (28%)**
AO3 Problem solving	**12 marks (30%)**