CALC J · 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

Reverse percentage · R9 · Ratio & proportion · AO1 · 2 marks

QN	ANSWER	MARK	GUIDANCE
1	**£53.90**	**M1**	For $64.68 \div 1.2$ oe
		A1	cao

Question 2

Standard form · N9 · Number · AO1 · 2 marks

QN	ANSWER	MARK	GUIDANCE
2	1.41×10^4	**M1**	For $120 \div (8.5 \times 10^{-3})$, or 14 117.6 . . . seen
		A1	Accept 1.41×10^4 to 1.412×10^4

Question 3

Ratio with fractions · R8 · Ratio & proportion · AO3 · 3 marks

QN	ANSWER	MARK	GUIDANCE
3	**£378**	**P1**	For a correct ratio for Asha : Ben : Cara, e.g. $1 : \frac{3}{4} : \frac{1}{2}$ or 4 : 3 : 2
		P1	For $84 \div (4 - 2)$ $(= 42)$, or Asha's share $= 168$
		A1	cao

Question 4

Histograms · S3 · Statistics · AO1 · AO2 · 3 marks

QN	ANSWER	MARK	GUIDANCE
4(a)	80	M1	For frequency = frequency density × class width for at least 3 bars, e.g. 12, 18, 22, 20, 8
		A1	cao
4(b)	No, with working	C1	For 28 customers waited more than 20 minutes and 28 < 40 (half of 80), so Lily is not correct; ft their part (a)

Question 5

Simultaneous equations · A19 · A21 · Algebra · AO3 · 4 marks

QN	ANSWER	MARK	GUIDANCE
5	£6.10	P1	For forming $3a + 2c = 47.10$ and $4a + 5c = 80.30$
		P1	For a correct method to eliminate one variable, e.g. $7a = 74.90$ or $7c = 52.50$
		P1	For $a = 10.70$ and $c = 7.50$, and $2a + 3c$ $(= 43.90)$
		A1	cao

Question 6

Compound interest · R16 · Ratio & proportion · AO2 · 3 marks

QN	ANSWER	MARK	GUIDANCE
6	Yes, with working	M1	For 4500×1.038^n for any $n \geqslant 2$
		M1	For the value after 7 years = 5842.43 . . . and after 8 years = 6064.44 . . .
		C1	For stating Sam is correct, as £5842.44 < £6000 < £6064.45

Question 7

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

QN	ANSWER	MARK	GUIDANCE
7	14.1 cm	M1	For $\frac{AC}{\sin 67°} = \frac{9.4}{\sin 38°}$
		M1	For $AC = \frac{9.4 \times \sin 67°}{\sin 38°}$
		A1	Accept 14.0 to 14.1

Question 8

Conditional probability · P8 · P9 · Probability · AO1 · AO2 · 4 marks

QN	ANSWER	MARK	GUIDANCE
8(a)	0.7, 0.8, 0.25	B1	For all three probabilities correct
8(b)	No, with $\frac{4}{39}$	M1	For 0.3×0.2 $(= 0.06)$ and 0.7×0.75 $(= 0.525)$
		M1	For $\frac{0.06}{0.06+0.525}$
		C1	For $\frac{4}{39}$ or 0.102 to 0.103, and stating Kim is not correct as this is more than 0.1

Question 9

Iteration · A20 · Algebra · AO1 · 3 marks

QN	ANSWER	MARK	GUIDANCE
9	1.7601	M1	For $x_1 = 1.7099\ldots$
		M1	For $x_2 = 1.7736\ldots$
		A1	For $x_3 = 1.7601$ cao

Question 10

Area of a triangle · G23 · Geometry & measures · AO1 · 2 marks

QN	ANSWER	MARK	GUIDANCE
10	49.5°	M1	For $\frac{1}{2} \times 7.2 \times 9.5 \times \sin QPR = 26$, or $\sin QPR = \frac{52}{68.4}$
		A1	Accept 49.4 to 49.5

Question 11

Trigonometric graphs · A13 · Algebra · AO2 · 3 marks

QN	ANSWER	MARK	GUIDANCE
11(a)	$y = \sin(x - 30°)$	B1	oe
11(b)	**Yes, with reason**	C1	For $y = -\sin x$ is a reflection of $y = \sin x$ in the x-axis, and $y = \sin(x + 180°)$ is a translation of 180° to the left
		C1	For stating Raj is correct, as both transformations give the same curve, e.g. both pass through $(0, 0)$, $(90, -1)$ and $(270, 1)$

Question 12

Upper and lower bounds · N16 · Number · AO1 · AO2 · AO3 · 4 marks

QN	ANSWER	MARK	GUIDANCE
12(a)	**64.85 s**	B1	cao
12(b)	**1.53 m/s**	P1	For $99.5 \div 64.85$
		A1	Accept 1.53 to 1.534
12(c)	**No, with reason**	C1	For, e.g., the lower bound of her speed (1.53 m/s) is less than 1.55 m/s, so her speed may not be more than 1.55 m/s; ft their part (b)

Question 13

Volume of a sphere · G17 · Geometry & measures · AO3 · 4 marks

QN	ANSWER	MARK	GUIDANCE
13	**14.2**	P1	For the volume of the sphere $= \frac{4}{3}\pi \times 6^3$ $(= 288\pi$ or $904.7\ldots)$
		P1	For the volume of the cylinder $= \pi \times 4.5^2 \times h$ $(= 20.25\pi h)$
		P1	For $h = 288\pi \div 20.25\pi$ oe
		A1	Accept 14.2 to 14.23

Paper overview

Q	TOPIC	SPEC REF	STRAND	AO	MARKS
1	Reverse percentage	R9	Ratio & proportion	AO1	2
2	Standard form	N9	Number	AO1	2
3	Ratio with fractions	R8	Ratio & proportion	AO3	3
4	Histograms	S3	Statistics	AO1 · AO2	3
5	Simultaneous equations	A19 · A21	Algebra	AO3	4
6	Compound interest	R16	Ratio & proportion	AO2	3
7	Sine rule	G22	Geometry & measures	AO1	3
8	Conditional probability	P8 · P9	Probability	AO1 · AO2	4
9	Iteration	A20	Algebra	AO1	3
10	Area of a triangle	G23	Geometry & measures	AO1	2
11	Trigonometric graphs	A13	Algebra	AO2	3
12	Upper and lower bounds	N16	Number	AO1 · AO2 · AO3	4
13	Volume of a sphere	G17	Geometry & measures	AO3	4
Total					**40**

Marks by strand

Number	**6 marks (15%)**
Algebra	**10 marks (25%)**
Ratio & proportion	**8 marks (20%)**
Geometry & measures	**9 marks (22%)**
Probability	**4 marks (10%)**
Statistics	**3 marks (8%)**

Marks by assessment objective

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