NON-CALC B · 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

Mixed number division · N2 · Number · AO1 · 3 marks

QN	ANSWER	MARK	GUIDANCE
1	$2\frac{2}{5}$	M1	For writing both as improper fractions, $\frac{8}{3}$ and $\frac{10}{9}$
		M1	For $\frac{8}{3} \times \frac{9}{10} \left(= \frac{72}{30}\right)$
		A1	cao

Question 2

Reverse percentage · R9 · Ratio & proportion · AO2 · 3 marks

QN	ANSWER	MARK	GUIDANCE
2	**No, she saved £60**	M1	For $340 \div 0.85$ oe, or $85\% = \$340$
		A1	For the original price of £400
		C1	For a saving of £60 and stating that Priya is not correct

Question 3

Venn diagram probability · P6 · Probability · AO1 · 4 marks

QN	ANSWER	MARK	GUIDANCE
3(a)	21, 7, 12, 10	M1	For 7 in the intersection and one of 21 (French only) or 12 (Spanish only)
		A1	For a fully correct diagram, including 10 outside the circles
3(b)	$\frac{33}{50}$	M1	For $21 + 12$ $(= 33)$
		A1	oe

Question 4

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

QN	ANSWER	MARK	GUIDANCE
4(a)	$6n - 1$	M1	For $6n + k$, where $k \neq -1$
		A1	cao
4(b)	No, with reason	M1	For $6n - 1 = 100$, or for finding the terms 95 and 101
		C1	For No, as $n = 16\frac{5}{6}$ is not a whole number, or 100 lies between consecutive terms 95 and 101

Question 5

Angles in parallel lines · G3 · G6 · Geometry & measures · AO2 · 3 marks

QN	ANSWER	MARK	GUIDANCE
5	66°	B1	For angle $EFG = 52°$ or angle $EGF = 62°$
		B1	For $x = 66°$
		C1	For the reasons: alternate angles are equal; angles on a straight line add up to 180°; angles in a triangle add up to 180°

Question 6

Standard form · N9 · Number · AO1 · 2 marks

QN	ANSWER	MARK	GUIDANCE
6	4×10^9	M1	For $3.2 \div 8 = 0.4$, or 0.4×10^{10}
		A1	cao

Question 7

Expanding triple brackets · A4 · Algebra · AO1 · 3 marks

QN	ANSWER	MARK	GUIDANCE
7	$2x^3 - x^2 - 13x - 6$	M1	For expanding two of the brackets, e.g. $x^2 - x - 6$
		M1	For at least 6 correct terms of the full expansion, e.g. $2x^3 + x^2 - 2x^2 - x - 12x - 6$
		A1	cao

Question 8

Direct proportion · R13 · Ratio & proportion · AO1 · AO3 · 5 marks

QN	ANSWER	MARK	GUIDANCE
8(a)	**75**	M1	For $y = kx^2$
		M1	For $48 = k \times 16$, so $k = 3$
		A1	cao
8(b)	**125%**	P1	For 1.5^2 $(= 2.25)$, or e.g. $x = 4 \rightarrow 6$ gives $y = 48 \rightarrow 108$
		A1	cao

Question 9

Recurring decimal proof · N10 · Number · AO2 · 2 marks

QN	ANSWER	MARK	GUIDANCE
9	**Proof**	**M1**	For e.g. $100x = 15.555\ldots$ and $10x = 1.555\ldots$
		C1	For $90x = 14$, so $x = \frac{14}{90} = \frac{7}{45}$

Question 10

Exact trigonometric values · G21 · Geometry & measures · AO3 · 3 marks

QN	ANSWER	MARK	GUIDANCE
10	$6\sqrt{3} - 6$ **cm**	**P1**	For $BD = 6$ (as $\tan 45° = 1$, or triangle ABD is isosceles)
		P1	For $BC = \frac{6}{\tan 30°} = 6\sqrt{3}$
		A1	cao

Question 11

Quadratic area problem · A18 · A21 · Algebra · AO2 · AO3 · 5 marks

QN	ANSWER	MARK	GUIDANCE
11(a)	**Shown**	**M1**	For $(2x + 1)(x + 3) = 52$
		C1	For $2x^2 + 6x + x + 3 = 52$ leading to $2x^2 + 7x - 49 = 0$
11(b)	**29 cm**	**P1**	For $(2x - 7)(x + 7) = 0$, or a correct use of the formula
		P1	For $x = 3.5$ (rejecting $x = -7$)
		A1	cao, from sides of 8 cm and 6.5 cm

Question 12

Vector proof · G25 · Geometry & measures · AO3 · 3 marks

QN	ANSWER	MARK	GUIDANCE
12	**Proof**	**P1**	For $\overrightarrow{AN} = -\mathbf{a} + \frac{2}{3}(\mathbf{a}+\mathbf{c}) = \frac{1}{3}(2\mathbf{c}-\mathbf{a})$
		P1	For $\overrightarrow{AM} = \mathbf{c} - \frac{1}{2}\mathbf{a} = \frac{1}{2}(2\mathbf{c}-\mathbf{a})$
		C1	For $\overrightarrow{AM} = \frac{3}{2}\overrightarrow{AN}$, so AN and AM are parallel and share the point A, so A, N and M lie on a straight line

Paper overview

Q	TOPIC	SPEC REF	STRAND	AO	MARKS
1	Mixed number division	N2	Number	AO1	3
2	Reverse percentage	R9	Ratio & proportion	AO2	3
3	Venn diagram probability	P6	Probability	AO1	4
4	Linear sequences	A25	Algebra	AO1 · AO2	4
5	Angles in parallel lines	G3 · G6	Geometry & measures	AO2	3
6	Standard form	N9	Number	AO1	2
7	Expanding triple brackets	A4	Algebra	AO1	3
8	Direct proportion	R13	Ratio & proportion	AO1 · AO3	5
9	Recurring decimal proof	N10	Number	AO2	2
10	Exact trigonometric values	G21	Geometry & measures	AO3	3
11	Quadratic area problem	A18 · A21	Algebra	AO2 · AO3	5
12	Vector proof	G25	Geometry & measures	AO3	3
Total					**40**

Marks by strand

Number	**7 marks (18%)**
Algebra	**12 marks (30%)**
Ratio & proportion	**8 marks (20%)**
Geometry & measures	**9 marks (22%)**
Probability	**4 marks (10%)**
Statistics	**0 marks (0%)**

Marks by assessment objective

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