

Question	Working	Answer	Mark	Notes
1(a)	$(9 + 6) \times 12$	180	2	M1 for $(9 + 6) \times 12$ A1 cao
1(b)	$(156 \div 12) - 6$	7	2	M1 for $(156 \div 12) - 6$ A1 cao
1(c)		$C = 12(n + 6)$	3	B3 for a fully correct formula [B2 for $12(n + 6)$ or $C = 12(n + k)$ Or $C = p(n + 6)$ B1 for $12n$ or $(n + 6)$ seen]
2(a)	$\text{€}239.99 \approx \text{€}240 = \text{£}200$ $\text{\$}279.95 \approx \text{\$}280 \approx \text{£}185$	American website since $185 < 200$	4	M1 for reading using either graph to convert any factor of either $\text{€}240$ or $\text{\$}280$ into pounds or an attempt to find either conversion factor A1 for any correct conversion factor or $\text{£}200$ or $\text{£}185$ ($\pm \text{£}4$) A1 for both $\text{£}200$ and $\text{£}185$ ($\pm \text{£}4$) C1 for 'American website since $185 < 200$ ' oe
2(b)	$\text{£}100 = \text{€}120$ $\text{£}100 = \text{\$}150$ $150/120$	1.25	2	M1 for $150/120$ oe A1 for 1.25 (± 0.04) [B1 for 0.8 if M0 scored]

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3(a)	$90 \div 2$ $45 \div 3$ $15 \div 3$ 5	$2 \times 3 \times 3 \times 5$	3	M1 for a complete method of at least 2 correct divisions, condone one arithmetic error A1 for 2, 3, 3, 5 seen (maybe in a factor tree) A1 for $2 \times 3 \times 3 \times 5$ oe
3(b)	$90 = 2 \times 3 \times 3 \times 5$ $108 = 2 \times 2 \times 3 \times 3 \times 3$ $\text{LCM} = 2 \times 2 \times 3 \times 3 \times 3 \times 5$	540	2	M1 for $90 = 2 \times 3 \times 3 \times 5$ and $108 = 2 \times 2 \times 3 \times 3 \times 3$ A1 cao
4(a)		2	1	B1 cao
4(b)		Negative	1	B1 cao
4(c)		2.6 to 2.9	2	B2 for answer in the range 2.6 to 2.9 [B1 for a line of best fit drawn if answer outside this range]
5(a)		Triangle at (0, -2), (3, -2), (0, -4)	2	B2 for a correct rotation [B1 for correct orientation or correct rotation 90° anticlockwise]
5(b)		Enlargement, scale factor 3 about (0, 0)	3	B1 for enlargement B1 for scale factor of 3 B1 for centre (0, 0) oe

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6(a)	$180 \times 2 = 360$	Proof	2	M1 for splitting the quad into two triangles C1 for stating $180 \times 2 = 360$
6(b)	$(180 - 120)/2$	30	2	M1 for $(180 - 120)/2$ A1 cao
6(c)	$360 - 54 - 108 - (180 - 30)$	48	2	M1 for $360 - 54 - 108 - (180 - '30')$ A1 cao
7(a)		Biased sample	1	B1 for 'biased sample' oe
7(b)		Eg: stopping the 1 st 100 people in the town centre OR knock on 100 doors in the local area	1	B1 for an acceptable method
7(c)		How many times in a month would you use the swimming pool? 0 1-3 4-5 6+	2	B1 for including a time period in an appropriate question B1 for at least 3 non-overlapping response boxes.
8		Correct region shaded	3	B1 for $y = 2$ draw B1 for a circle, radius 3cm, centre C drawn B1 for correct region

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9	$240 \div 8 = 30$ $\text{Ann} = 30 \times 3 = 90$ $\text{Bob} = 30 \times 5 = 150$ $90 \div 2 + 150 \div 10 = 60$ OR $\text{Ann} = 3/8$ $\text{Bob} = 5/8$ $3/8 \times 1/2 + 5/8 \times 1/10$ $3/16 + 5/80 = 15/80 + 5/80$	$60/240 (= 1/4)$	4	M1 for $240 \div 8 = 30$ M1 for $30 \times 3 (= 90)$ or $30 \times 5 (= 150)$ M1 for ' 90 ' $\div 2 + '150' \div 10$ A1 cao OR M1 for $3/8$ or $5/8$ M1 for $3/8 \times 1/2 + 5/8 \times 1/10$ M1 for $3/16 + 5/80$ A1 cao
10(a)		330	1	B1 for $330 \pm 2^\circ$
10(b)		Line drawn	1	B1 for line drawn $\pm 2^\circ$
11(a)	$4 + 15/24 + 16/24$ $= 4 + 31/24$	$5 \frac{7}{24}$	2	M1 for $4 + 15/24 + 16/24$ oe A1 cao
11(b)	$7/2 \div 14/5$ $= 7/2 \times 5/14$	$1 \frac{1}{4}$	2	M1 for $7/2$ or $14/5$ seen A1 cao
12(a)		-2, -1, 0, 1, 2, 3	2	B2 for all 6 correct integers and no extras [-1 for each error or omission]
12(b)	$11 - x \leq 2x + 6$ $5 \leq 3x$	$x \geq 1 \frac{2}{3}$	2	M1 for $11 - 6 \leq 2x + x$ A1 cao

Question	Working	Answer	Mark	Notes
13(a)		$12x + 18$	1	B1 cao
13(b)		$3y + 2z$	2	B2 cao [B1 for $3y$ or $2z$]
13(c)	$p^2 + 6p - 3p - 18$	$p^2 + 3p - 18$	2	M1 for 3 out of 4 correct terms or 4 terms correct ignoring signs
13(d)	$2(4m^2 - 1)$	$2(2m - 1)(2m + 1)$	2	M1 for $2(4m^2 - 1)$ or $(2m \pm 1)(2m \pm 1)$ A1 cao
14(a)		Cf graph	3	B3 for a cf graph drawn through (10,3), (20,13), (30,30), (40,60), (50,81), (60,88) and (70,90) [B2 for points plotted consistently within the intervals and joined, condone one plotting error. B1 for a correct cf table]
14(b)		35 to 38	1	B1 for an answer in the range 35 to 38 inc.
14(c)	90 - 26	64	2	M1 for a reading taken at $x = 28$ A1 for an answer in the range 61 to 67
15(a)(i) (ii)	$86 \div 2$	43 Angle at centre = 2x angle at circumference	2	B1 cao B1 for a correct reason
15(b)(i) (ii)	$180 - 43$	137 Sum of the opposite angles of a cyclic quad = 180°	2	B1 cao B1 for a correct reason

Question	Working	Answer	Mark	Notes
16	$8x - 6y = 22$ $30x + 6y = -3$ <hr/> $38x = 19; x = 0.5$ $4x \cdot 0.5 - 3y = 11$ $3y = -9$	0.5, -3	4	M1 for a correct method of eliminating one unknown, condone one error. A1 for one correct unknown M1 for substituting found value into one of the equations A1 for 0.5 and -3
17	$2 \times 340.5 + 2 \times 117.5$ $= 681 + 235$	916	2	M1 for either 340.5 or 117.5 seen A1 cao
18(a)	$x = 0.292929\dots$ $100x = 29.292929\dots$ $99x = 29$	29/99	2	M1 for 0.292929... A1 for 29/99 oe
18(b)	$y = 0.0x0x0x\dots$ $100y = x.0x0x0x\dots$ $99y = x$ so $y = x/9$	Proof	2	M1 for for sight of two recurring decimals whose difference is a rational number A1 for completion of proof
19(a)		0.8 on Julie branch 0.4, 0.6, 0.4 on Pat branch	2	B1 for 0.8 B1 for 0.4, 0.6, 0.4
19(b)	0.2 x 0.6	0.12	2	M1 for 0.2 x 0.6 A1 cao

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20(a)		A sample selected taking into account the population of different groups (strata)	1	B1 for an acceptable reason
20(b)	$147/454 \approx 1/3$ $90 \div 3$	30	2	M1 for $90 \times 147/454$ A1 for 30
21	$\frac{1}{3} \pi \times 9^2 \times 6 - \frac{1}{3} \pi \times 3^2 \times 2$ OR $\frac{1}{3} \pi \times 9^2 \times 6) \times \frac{26}{27}$	156π	4	M1 for $\frac{1}{3} \pi \times 9^2 \times 6$ or $\frac{1}{3} \pi \times 3^2 \times 2$ A1 for 162π or 6π M1 for $162\pi - 6\pi$ A1 cao
22(a)	$\frac{1}{2} (x + 2 + x + 6)(x - 5)$ $= (x + 4)(x - 5) = 36$ $x^2 + 4x - 5x - 20 = 36$	Proof	4	M1 for $\frac{1}{2} (x + 2 + x + 6)(x - 5)$ oe M1 for $\frac{1}{2} (x + 2 + x + 6)(x - 5) = 36$ M1 for $x^2 + 4x - 5x - 20 = 36$ A1 for completion of proof
22(b)(i)	$(x + 7)(x - 8) = 0$	$x = 8, x = -7$	4	M1 for $(x + 7)(x - 8) (= 0)$ A1 for $x = 8$
(ii)	$8 + 2 = 10, 8 - 5 = 3, 8 + 6 = 14$	3		A1 for $x = -7$ B1 ft for 3