Mark scheme

Non-Calculator Crossover Paper 9

40 marks · 45 minutes · Non-Calculator

M = method mark A = accuracy mark (depends on M marks) B = independent mark C = communication
ft = follow through cao = correct answer only oe = or equivalent isw = ignore subsequent working

Q	Answer	Mark	Guidance
1(a) N9	720 000	**B1**	cao
1(b)	1.5×10^{11}	**M1** **A1**	for 15×10^{10} or 150 000 000 000 seen for 1.5×10^{11} 15×10^{10} as a final answer scores M1 A0.
			Total for Question 1: 3 marks
2(a) N4	$2^2 \times 3^2 \times 5$	**M1** **A1**	for at least two correct steps of a factor tree or repeated division for $2^2 \times 3^2 \times 5$ or $2 \times 2 \times 3 \times 3 \times 5$
2(b)	18	**M1** **A1**	for $126 = 2 \times 3^2 \times 7$, or for listing at least 4 factors of each number including a common factor greater than 9 for 18
			Total for Question 2: 4 marks
3 R9	17.5%	**M1** **A1**	for $\frac{7}{40} \times 100$, or for $\frac{47}{40} \times 100$ (= 117.5) for 17.5
			Total for Question 3: 2 marks
4 N2	£1348	**M1** **M1** **A1**	for a complete method to multiply 236 by 18, e.g. grid, column or Napier's bones (dep) for their 4248 – 2900 for 1348 Allow one arithmetic error in the multiplication for the first M1.
			Total for Question 4: 3 marks

Q	Answer	Mark	Guidance
5 R10	Large bottle, with correct working	**M1** **M1** **C1**	for a correct method to compare, e.g. 450 ÷ 7.5 (= 60p per 100 ml) or 660 ÷ 12 (= 55p per 100 ml), or 1.2 litres = 1200 ml seen with a division for a complete method giving two comparable values, e.g. 60p and 55p per 100 ml, or £6 and £5.50 per litre, or £18 and £16.50 for 3 litres for Large bottle, supported by correct comparable values
			Total for Question 5: 3 marks
6(a) G13	A 5 cm by 2 cm rectangle with lines across it 1 cm and 4 cm from one end	**B1** **B1**	for a 5 by 2 rectangle (any orientation) for a fully correct plan, including both lines across the rectangle, 1 cm and 4 cm from one end Ignore lines showing individual cubes, provided the two required lines can be seen.
6(b)	A 2 cm wide by 3 cm tall rectangle	**B1**	for a 2 by 3 rectangle (width 2, height 3) with no internal lines The end column is the full depth of the prism, so no other edges can be seen from the side. Ignore lines showing individual cubes.
			Total for Question 6: 3 marks
7(a) R4 R5	$\frac{2}{9}$	**B1**	for $\frac{2}{9}$ oe $\frac{2}{7}$ scores B0.
7(b)	18	**M1** **M1** **A1**	for 54 ÷ 9 (= 6), or for 12 adults or 42 children for children now = their 12 × 2 (= 24) for 18
			Total for Question 7: 4 marks
8(a) S4	1	**B1**	cao 7 (the highest frequency) scores B0.
8(b)	2.15	**M1** **M1** **A1**	for at least 3 correct products, e.g. 1 × 7, 2 × 6, 3 × 4, 4 × 3 for their total of products ÷ 20, e.g. 43 ÷ 20 for 2.15 oe 43 ÷ 4 = 10.75 scores M1 M0 A0.
			Total for Question 8: 4 marks

Q	Answer	Mark	Guidance
9(a) P6	D only 18, both 8, C only 11, outside 11	**M1** **A1**	for 8 in the intersection and one of 18 or 11 correctly placed inside a circle for a fully correct Venn diagram, including 11 outside the circles
9(b)	$\frac{11}{48}$	**B1**	for $\frac{11}{48}$ oe (ft their Venn diagram)
			Total for Question 9: 3 marks
10 A5	$m = \frac{A + 6k}{3}$	**M1** **A1**	for a correct first step, e.g. $A = 3m - 6k$ or $\frac{A}{3} = m - 2k$ for $m = \frac{A + 6k}{3}$ oe, e.g. $m = \frac{A}{3} + 2k$
			Total for Question 10: 2 marks
11 G3	99°	**M1** **M1** **A1**	for the interior angle of the pentagon = 108°, e.g. (5 – 2) × 180 ÷ 5 or 180 – 360 ÷ 5 for angle EAG = 360 – 108 – 90 (= 162), and angle AGE = (180 – 162) ÷ 2 (= 9) for 99 $AE = AG$ (sides of the pentagon and square are equal), so triangle AEG is isosceles; then $x = 90 + 9$. An answer of 9 scores M1 M1 A0.
			Total for Question 11: 3 marks
12 A18	$x = 4$, $x = -9$	**M1** **M1** **A1**	for $(x \pm 4)(x \pm 9)$ for $(x - 4)(x + 9)$ for 4 and –9 Correct answers with no working (e.g. from trial) score 3 marks only if both are given.
			Total for Question 12: 3 marks
13 A19	$x = 4$, $y = 3$	**M1** **M1** **A1**	for a correct method to eliminate one variable, e.g. $8x + 6y = 50$ and $9x - 6y = 18$ added to give $17x = 68$ (dep) for substituting their value to find the other variable for $x = 4$ and $y = 3$
			Total for Question 13: 3 marks