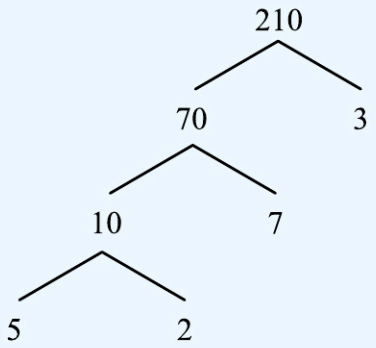
THIRD SPACE LEARNING

Mathematics Paper 1 (Non-Calculator) Higher Tier Mark Scheme

Edexcel GCSE

SET 5

Question	Working	Answer	Notes
Q1a		$2 \times 3 \times 5 \times 7$	M1 Correct prime factors identified A1 cao
Q1b	$90 = 2 \times 3 \times 3 \times 5$ $210 = 2 \times 3 \times 5 \times 7$ $HCF = 2 \times 3 \times 5 = 30$	30	M1 Compares prime factors of 90 and 210 or attempts to list the factors of 90 and 210 A1 cao
Q2a		5, 7, 8, 9, 10, 11	
Q2b	$n(A \cap B) = 3$ $n(\xi) = 12$ $\frac{3}{12} = \frac{1}{4}$	$\frac{3}{12}$	M1 $n(A \cap B) = 3$ seen or implied A1 $\frac{3}{12}$ oe
Q3	$3.15 \times 10^{4} = 31500$ $3.15 \times 10^{-2} = 0.0315$ $3.15 \times 10^{-1} = 0.315$ 3150 0.0315, 0.315, 3150, 31500	3.15×10^{-2}, 3.15×10^{-1}, 3150, 3.15×10^{4}	M1 Correctly converts at least two values A1 cao

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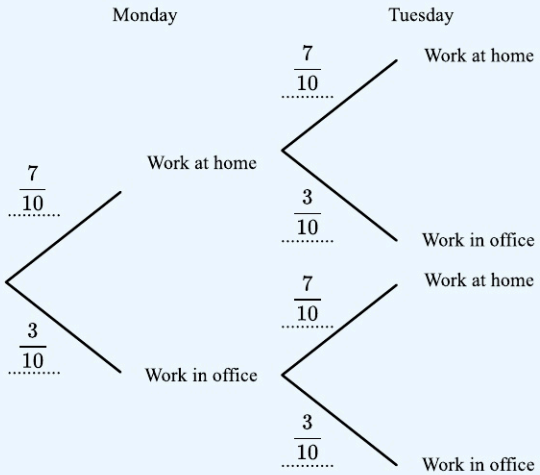
Question	Working	Answer	Notes
Q4	$\frac{7}{4} \times \frac{7}{3} = \frac{49}{12} = 4\frac{1}{12}$	$4\frac{1}{12}$	M1 Correctly converts both to improper fractions A1 cao
Q5	$360 = 60\%$ $60 = 10\%$ $600 = 100\%$	£600	M1 $360 = 60\%$ seen or implied A1 cao
Q6	Pentagon: $\frac{3 \times 180}{5} = 108$ Triangle: $\frac{180}{3} = 60$ $108 + 60 + 60 = 228$ $360 - 228 = 132$		M1 Interior angle of pentagon = 108 M1 $108 + 108 + 60 = 228$ A1 Full solution with no errors
Q7a	$p \times p = \frac{49}{100}$ $p = \sqrt{\frac{49}{100}} = \frac{7}{10}$ 		M1 $p = \sqrt{\frac{49}{100}} = \frac{7}{10}$ M1 P(work in office) $= \frac{3}{10}$ A1 Correctly completed tree diagram

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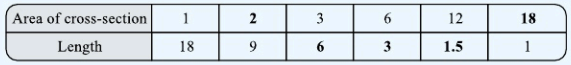
Question	Working	Answer	Notes
Q7b	P(office, home): $\frac{3}{10} \times \frac{7}{10} = \frac{21}{100}$ P(home, office): $\frac{7}{10} \times \frac{3}{10} = \frac{21}{100}$ $\frac{21}{100} + \frac{21}{100} = \frac{42}{100}$	$\frac{42}{100}$ oe	M1 for a correct probability for one day (e.g. "$\frac{3}{10}$" × "$\frac{7}{10}$" or "$\frac{7}{10}$" "$\frac{3}{10}$") *ft* their value for p in pt (a) M1 *ft* their "$\frac{21}{100}$" × 2
Q8a	$\frac{5^5 \times 5^{-2}}{5} = \frac{5^3}{5} = 5^2 = 25$	25	M1 Numerator simplified to 5^3 A1 cao
Q8b		$\frac{1}{8}$	
Q8c	$\sqrt[3]{125} = 5$	5	
Q9	$x^2 - 3x + 10 = 0$ $(x - 5)(x + 2) = 0$ $x = 5$ or $x = -2$	$x = 5$ or $x = -2$	M1 Makes = 0 M1 Factorises correctly A1 both solutions correct
Q10a			B2 All correct (B1 At least 3 correct)
Q10b		$18cm^3$	
Q10c	Length = 2, so area of cross-section = 9 Side length, $x = 3cm$ Surface area = 2 × 9 + 4 × 3 × 2 $= 42cm^2$	$42cm^2$	B1 Area of cross-section = 9 M1 $x = 3cm$ M1 Surface area = 2 × 9 + 4 × 3 × 2 A1 cao

Area of cross-section	1	**2**	3	6	12	**18**
Length	18	9	**6**	**3**	**1.5**	1

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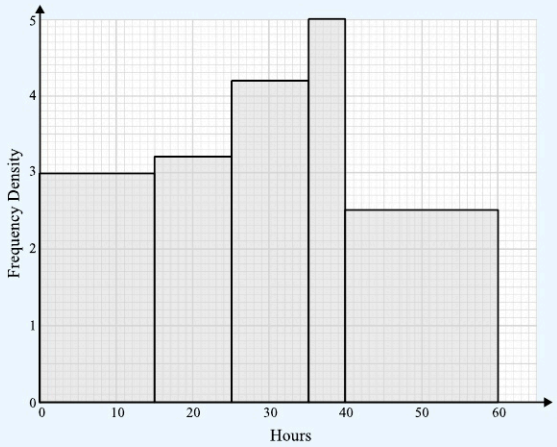
Question	Working	Answer	Notes
Q11	$\frac{14}{25} = \frac{56}{100} = 56\%$	No	M1 Sight of $\frac{14}{25}$ oe M1 56% correctly calculated A1 Correct conclusion from correct working
Q12a		Frequency densities: 3, 3.2, 4.2, 5, 2.5	M1 At least 4 correct frequency densities M1 Appropriate scale on axes A1 Correct histogram
Q12b	$5 \times 4.2 + 5 \times 5 = 46$	$\frac{46}{194}$	M1 5×4.2 seen or implied A1 $\frac{46}{194}$ oe
Q13	$0.688\ldots - 0.122\ldots = 0.566\ldots$ $x = 0.566...$ $10x = 5.666...$ or $100x = 56.666...$ oe $9x = 5.1$ or $90x = 51$ oe $x = \frac{51}{90} = \frac{17}{30}$	$\frac{17}{30}$	M1 $0.688\ldots - 0.122\ldots = 0.566\ldots$ M1 Multiplies 0.566666666 by power of 10 M1 Reaches $\frac{51}{90}$ A1 Correct simplified fraction

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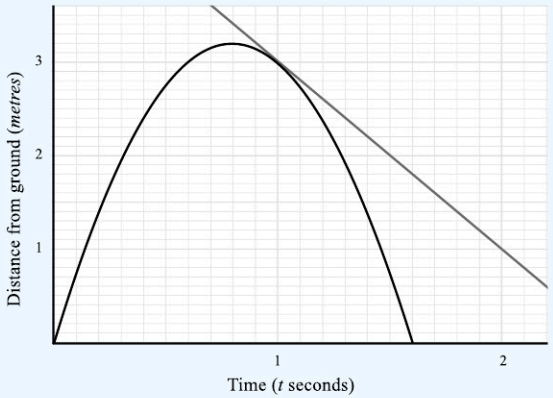
Question	Working	Answer	Notes
Q14	$y = kx^2$ $36 = k \times 100$ $k = 0.36$ $y = 0.36 \times 3^2 = 0.36 \times 9 = 3.24$	3.24	M1 $36 = k \times 100$ M1 $y = 0.36 \times x^2$ seen or implied A1 cao
Q15	 Gradient $= \frac{1-3}{2-1} = -2$	-2	M1 Tangent drawn M1 Calculates gradient of their tangent A1 Answer in range -2.3 to -1.7
Q16	$\frac{x}{360} \times 2 \times \pi \times 6 = 7\pi$ $\frac{12x}{360} = 7$ $\frac{x}{30} = 7$ $x = 210°$ Area $= \frac{210}{360} \times \pi \times 6^2 = \frac{7}{12} \times \pi \times 36$ $= 21\pi$	21π cm^2	M1 $\frac{x}{360} \times 2 \times \pi \times 6 = 7\pi$ A1 Angle $= 210°$ M1 ft Area $= \frac{\text{“their 210”}}{360} \times \pi \times 6^2$ A1 cao

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Question	Working	Answer	Notes
Q17	$r = \frac{7(2p+1)}{5p-3}$ $r(5p-3) = 7(2p+1)$ $5pr - 3r = 14p + 7$ $5pr - 14p = 7 + 3r$ $p(5r-14) = 7 + 3r$ $p = \frac{7+3r}{5r-14}$	$p = \frac{7+3r}{5r-14}$	M1 Multiplies by $5p - 3$ M1 Expands and attempts to move p terms to one side M1 Factorises A1 $p = \frac{7+3r}{5r-14}$ oe
Q18	$5x + 10y = 210$ $x = 5y$ $25y + 10y = 210$ $35y = 210$ $y = 6$ $x = y \times 6 = 30$	30 5p coins 6 10p coins	M1 Attempts 2 equations A1 2 correct equations M1 Attempts to solve equations A1 cao

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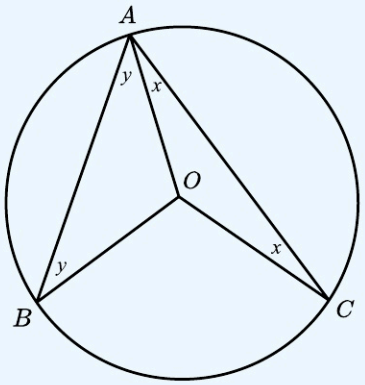
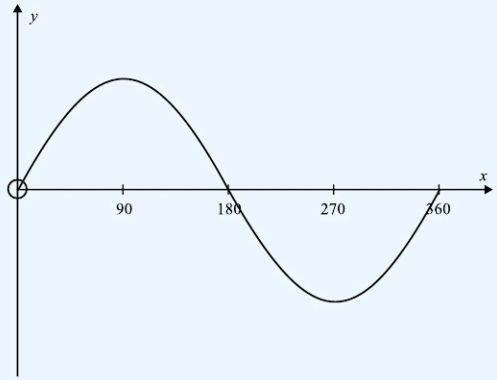
Question	Working	Answer	Notes
Q19	 Angle OAC = angle $OCA = x$ Angle OAB = angle $OBA = y$ Angle $BAC = x + y$ Angle $AOC = 180 - 2x$ Angle $AOB = 180 - 2y$ Angle $BOC = 360 - (180 - 2x) - (180 - 2y)$ $= 2x + 2y$ $= 2 \times$ angle BAC		M1 Splits into 2 isosceles triangles and identifies that Angle OAC = angle OCA and Angle OAB = angle OBA M1 Finds expressions for AOB and AOC M1 Finds expression for BOC A1 Correctly compares to BAC. Must follow fully correct working
Q20a			M1 Shape correct A1 All points of intersection with axes correct and -1 and 1 labelled

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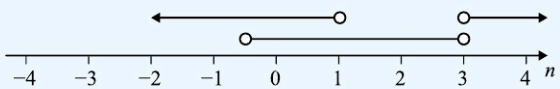
Question	Working	Answer	Notes
Q20b		45	
Q21a	$h^{-1}(x) = x - 3$ $h^{-1}(7) = 7 - 3 = 4$	4	
Q21b	$f(x) < g(x)$ $x^2 - 3 < 5x - x^2$ $2x^2 - 5x - 3 < 0$ $(2x + 1)(x - 3) < 0$ $-\frac{1}{2} < x < 3$ $g(x) < h(x)$ $5x - x^2 < x + 3$ $x^2 - 4x + 3 > 0$ $(x - 3)(x - 1) > 0$ $x < 1$ or $x > 3$  	$-\frac{1}{2} < x < 1$	M1 Attempts to solve $f(x) < g(x)$, rearranges to get $2x^2 - 5x - 3 < 0$ M1 Valid method to solve $2x^2 - 5x - 3 < 0$ e.g. factorising to $(2x \pm 1)(x \pm 3)$ or correct substitution into quadratic formula. Don't be concerned with incorrect inequality signs or = signs at this point M1 Valid method to solve $x^2 - 4x + 3 > 0$ e.g. $(x \pm 3)(x \pm 1)$ or correct substitution into quadratic formula. Don't be concerned with incorrect inequality signs or = signs at this point M1 $-\frac{1}{2} < x < 3$ **or** $x < 1$, $x > 3$ seen A1 cao

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0203 771 0095

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