

GCSE MATHEMATICS  
MARK SCHEME – Specimen paper (Linear) Higher Paper 3

Questions	Working	Answer	Mark	Notes
<b>1</b>		14	<b>3</b>	M1 for $5 \times 4 (=20)$ or $3 \times 2$ or attempt to divide diagram into rectangles M1 “20” – “6” or addition of parts A1 cao
<b>2 (a)</b>	$3 \times 4 + 4 \times -5 = 12 - 20$	-8	<b>2</b>	M1 substitution eg $3 \times 4$ and $4 \times -5$ or 12 and -20 A1 cao
<b>(b)</b>	$3 \times 2^2 - 5$ $3 \times 4 - 5$	7	<b>3</b>	M1 substitution eg $3 \times 2^2 - 5$ ; do not accept $32^2 - 5$ M1 $3 \times 4 - 5$ or $3 \times 2 \times 2 - 5$ or $12 - 5$ A1 cao
<b>3 (a)</b>	$\begin{array}{r} 679 \text{ or} \\ 28 \\ \hline 5432 \\ 13580 \\ 19012 \end{array}$	190.12	<b>3</b>	M1 for an attempt to multiply the units and tens, or correct partitioning M1 for completely correct method (condone one computational error) A1 cao
<b>(b)</b>	$570 \div 50$	12	<b>2</b>	M1 $570 \div 50$ or 11.4 or 11 seen A1 cao
<b>(c)</b>	$570 \times \frac{110}{100}$	627	<b>3</b>	M1 for $\frac{110}{100} \times 570$ or $570 \div 10$ or 57 seen M1 (dep) $570 + “57”$ (or M2 for $570 \times 1.10$ ) A1 cao

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<b>4</b> <b>(a)</b>  <b>(b)</b>		Correct drawing	<b>2</b>	B2 Condone hidden detail shown with solid lines, or missing lines on front face (B1 for correct plan and side elevation, cross-section correct with depth $> 1$ cube, or one added cube)
		Correct drawing	<b>2</b>	B2 Ignore relative proportion, do not accept a rectangle when one side $> 1.5x$ other side (B1 one shape only)
<b>5</b> <b>(a)</b> <b>(b)</b> <b>(c)</b> <b>(d)</b>		Points plotted	<b>1</b>	B1 $\pm 1$ full mark (2 mm square)
		Positive	<b>1</b>	B1 cao
		27<answer<32	<b>2</b>	B2 ft from a single line segment with positive gradient $\pm 1$ full (2 mm) square B1 lobf must pass through (5, 5) (5, 15) and (55, 35) and (55, 45)
<b>6</b>		$C = 1000(n + 3)$	<b>3</b>	B3 for $C=1000(n+3)$ or such as $(n+3) \times 1000$ (B2 for correct RHS or $C = n + 3 \times 1000$ , $C = 1000n + 3$ etc) (B1 for $C =$ some other linear expression in $n$ or $n + 3 \times 1000$ , $1000n + 3$ etc) NB $C = n$ scores no marks

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7		$p^3 - 3p^2$	2	B2 cao (B1 for $p^3$ or $3p^2$ seen in working, ignore signs)
		$y(y+5)$	2	B2 for $y(y+5)$ or $y \times (y+5)$ , (B1 for $y(ay+b)$ where $a, b, b \neq 0$ are numbers or $y+5$ seen on its own, or part of an expression)
		$2x(x+3y)$	2	B2 cao (B1 for $2(x^2+3xy)$ or $x(2x+6y)$ or $2x(\dots)$ )
	$x^2 - 2x - 15 = (x-5)(x+3)$	$5, -3$	2	B2 cao (B1 for $x-5$ ) or $(x+3)$ seen in working)
8		question + response boxes oe	2	1 <sup>st</sup> aspect: one question with time period (eg each day); ignore other questions 2 <sup>nd</sup> aspect: response list (at least two), no overlapping 3 <sup>rd</sup> aspect: some mention of units (eg hours or number of pieces) in either question or responses Award B2 for all these aspects, or B1 for just two aspects

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<b>9</b>	$(4 \times 3) \times 11 \div 2$	$66\text{cm}^3$	<b>4</b>	M2 for $4 \times 3 \times 11 \div 2$ (M1 for any three of these) A1 cao numerical answer of 66 B1 (indep) $\text{cm}^3$ with or without any numerical answer
<b>10</b>		Correct reflection	<b>2</b>	B2 cao (B1 for reflection in a line other than $y = 2$ )
<b>(b)</b>		Reflection in $y = x$	<b>2</b>	B2 cao (B1 for “reflection” or $y = x$ ) NB: inclusion with other transformations get B0
<b>11</b>	$9 - 2x = 3x + 6$	$\frac{3}{5}$	<b>3</b>	B1 for $3x + 6$ seen OR $3 - \frac{2}{3}x = x + 2$
<b>(a)</b>	$9 - 6 = 3x + 2x$ $3 = 5x$			M1 for correct rearrangement of 4 terms or $3 = 5x$
<b>(b)</b>		$-3, -2, -1, 0, 1$	<b>2</b>	A1 for $\frac{3}{5}$ oe B2 (B1 for 4 correct integers and not more than one incorrect integers or omissions)

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<b>12 (a)</b>	$1 + 2 + \frac{14}{35} + \frac{15}{35}$	$3\frac{29}{35}$	<b>3</b>	M1 for attempt to convert to fractions with common denominator eg two fractions, denominator of 35 A1 for correct conversion: $\frac{14}{35}$ and $\frac{15}{35}$ seen (oe) A1 cao OR Attempt to convert decimals: must use at least 2dp M1 $0.4 + 0.42$ (or $1.4 + 2.42$ ) or $0.4 + 0.43$ etc A1 3.82, 3.83, etc A1 3.82857 (ie at least 5 dp)
<b>(b)</b>	$\frac{2}{5} \times \frac{3}{7} = \frac{6}{35}$	$\frac{6}{35}$	<b>2</b>	M1 For 6 or multiplication of top or bottom eg $\frac{6}{35}, \frac{840}{4900}$ A1 cao
<b>13</b>	$\frac{10}{6} \times 4.8$	8	<b>2</b>	M1 for $4.8 \div 6 \times 10$ A1 cao
<b>14</b>		1 <sup>st</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup>	<b>3</b>	B3 (B1 for each, –1 each extra)
<b>15</b>	$x + 0.35 + 0.15 + x = 1$ $0.25 \times 400$	100	<b>4</b>	M1 for $x + 0.35 + 0.15 + x = 1$ oe, or $0.5 \div 2$ M1 0.25 seen M1 $0.25 \times 400$ A1 cao accept 100 out of 400 (in words) SC B1 for $\frac{100}{400}$

GCSE MATHEMATICS  
MARK SCHEME – Specimen paper (Linear) Higher Paper 3

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<b>16</b> <b>(a)</b> <b>(i)</b> <b>(ii)</b>		40 Identifies angle between radius and tangent as $90^\circ$	<b>2</b>	B1 cao B1 reason in words, linking radius and tangent (edge insufficient)
<b>(b)</b> <b>(i)</b> <b>(ii)</b>	$2 \times 50^\circ \div 2 =$	$50^\circ$ Angle at the centre is twice the angle at the circumference.	<b>3</b>	May be in working or on diagram M1 $2 \times 50^\circ \div 2$ A1 $50^\circ$ B1 reason in words
<b>17</b> <b>(a)</b>		$\frac{1}{4}$ on LH branch $\frac{2}{3}, \frac{1}{3}, \frac{2}{3}$ on RH branches $\frac{7}{12}$	<b>2</b>	B1
<b>(b)</b>	$\frac{3}{4} \times \frac{2}{3} + \frac{1}{4} \times \frac{1}{3} = \frac{6}{12} + \frac{1}{12}$	84	<b>3</b>	M1 for $\frac{3}{4} \times \frac{2}{3}$ or $\frac{1}{4} \times \frac{1}{3}$ from their tree diagram M1(dep) for sum of two correct products A1 for $\frac{7}{12}$ oe M1 for $\frac{3}{4} \times \frac{1}{3} \left( = \frac{3}{12} \right)$ or $1 - \frac{9}{12}$ M1 for $21 \times \frac{12}{3}$ ft from their tree diagram; must be from a product A1 cao
<b>(c)</b>			<b>3</b>	

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<b>18</b>		0.8333...		
<b>(a)</b>			<b>1</b>	B1 for 0.8333... oe or 0.83
<b>(b)</b>	eg $x = 0.3636\dots$ so $100x = 36.3636\dots$ $99x = 36$ $x = \frac{36}{99} = \frac{4}{11}$		<b>3</b>	M1 for $100x = 36.36\dots$ M1 dep for subtraction of both sides A1 for $\frac{4}{11}$ from correct proof
<b>19</b>		28	<b>4</b>	[SC: B1 for $\frac{36}{11}$ or $4 \div = 0.3636$ showing remainders in divisions] B1 ft from (a) using “k”, dep on at least M1
<b>(a)</b>				
<b>(b)</b>	$24 = \frac{84}{r}$	3.5	<b>2</b>	M1 ft from (a) dep on at least M1 for putting $p = 24$ into their equation A1 oe eg $\frac{84}{24}$
<b>20</b>		1	<b>1</b>	B1 cao
<b>(a)</b>		9	<b>1</b>	B1 cao
<b>(i)</b>				
<b>(ii)</b>				

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<b>21</b> <b>(a)</b>		5	<b>2</b>	M1 for $\frac{76}{800} \times 50$ A1 for 4.75 or 5
<b>(b)</b>		Correct response and correct reason	<b>2</b>	M1 for Yr 7 boys = Year 11 girls $\times 2$ A1 for 6.875 and 3.43745
<b>22</b>	$\frac{\frac{4}{3}\pi(3x)^3}{\pi(4x)^2} = \frac{4}{3} \times \frac{3^3}{4^2} x$	$\frac{9x}{4}$	<b>3</b>	M1 for substitution in a correct formula, condone missing brackets M1 for a correct equation to find the depth including $h$ and brackets A1 for $\frac{9x}{4}$ oe
<b>23</b> <b>(a)</b>	$PR = -2a + 2b$	$-a + b$	<b>2</b>	B1 $PR = -2a + 2b$ or $a + b$ oe B1 oe
<b>(b)</b>	$OQ = 2a + 2b$ $OX = OP + PX = 2a - a + b = a + b = \frac{1}{2}OQ$		<b>2</b>	B1 $OX = OP + PX$ B1 equates $OX = a + b$ with $\frac{1}{2}OQ$