

GCSE Equivalency

Maths

GCSE Maths Equivalency

Mock Paper 1 (Non-Calculator)
Higher Level Mark Scheme

M

M

E

Mathsmadeeasy.co.uk

Total Marks: /100

Guidance on the use of codes within this mark scheme

M1 – method mark

A1 – accuracy mark

B1 – Working mark

C1 – communication mark

QWC – quality of written communication

oe – or equivalent

cao – correct answer only

ft – follow through

sc – special case

dep – dependent (on a previous mark or conclusion)

indep – independent

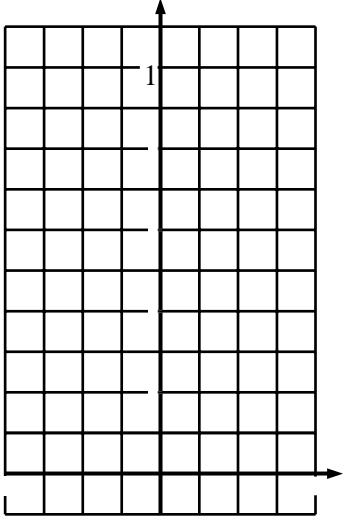
isw – ignore subsequent working

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Question	Working	Answer	Mark	Notes																																				
1	$\begin{array}{r} 183 \\ \times 47 \\ \hline 1281 \\ 7320 \\ \hline 8601 \end{array}$ <p>or</p> <table border="1" data-bbox="436 544 779 798"> <tr> <td></td> <td>1</td> <td>8</td> <td>3</td> <td>×</td> <td></td> </tr> <tr> <td></td> <td>4</td> <td>3</td> <td>1</td> <td>2</td> <td>4</td> </tr> <tr> <td>8</td> <td>7</td> <td>5</td> <td>2</td> <td>1</td> <td>7</td> </tr> <tr> <td></td> <td>6</td> <td>0</td> <td>1</td> <td></td> <td></td> </tr> </table> <p>or</p> <table border="1" data-bbox="421 890 761 1005"> <tr> <td>100</td> <td>80</td> <td>3</td> <td></td> </tr> <tr> <td>4000</td> <td>3200</td> <td>120</td> <td>40</td> </tr> <tr> <td>700</td> <td>560</td> <td>21</td> <td>7</td> </tr> </table> $\begin{aligned} &4000 + 3200 + 120 + 700 \\ &+ 560 + 21 = 8601 \end{aligned}$ <p>or</p> $\begin{aligned} 183 \times 100 &= 18\,300 \\ 183 \times 50 &= 18\,300 \div 2 = 9150 \\ 183 \times 3 &= 549 \\ 9150 - 549 &= 8601 \end{aligned}$		1	8	3	×			4	3	1	2	4	8	7	5	2	1	7		6	0	1			100	80	3		4000	3200	120	40	700	560	21	7	86.01	3	<p>M1 for a complete method to multiply 183 by 47 and attempt at addition (condone one multiplication error)</p> <p>A1 for digits 8601 given as the answer</p> <p>B1 (dep on M1) for correctly writing their answer to 2 decimal places</p>
	1	8	3	×																																				
	4	3	1	2	4																																			
8	7	5	2	1	7																																			
	6	0	1																																					
100	80	3																																						
4000	3200	120	40																																					
700	560	21	7																																					

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Question		Working	Answer	Mark	Notes
2	(a)	Plot (2, 250) and (3.1, 190)	Plot points	1	B1 for both points plotted accurately
	(b)		Relationship	1	B1 for “As the distance from the centre increases the monthly rent decreases” or the nearer you are to the centre the more you have to pay oe (accept negative correlation)
	(c)		200 to 260	2	M1 for attempting a correct method, eg a line of best fit or any other indication, on a line that could be used as a line of best fit eg line to graph at $x = 2.8$ or a mark on the line at 2.8 A1 for value in the range 200 to 260
3	(a)		2 reasons	2	B2 for 2 different reasons from given examples (B1 for 1 reason from given examples) eg No time frame eg No box for less than £10 accept no box for zero or none or £0 eg Overlapping intervals or boxes or £30 and/ or £50 in two boxes
	(b)		1 reason	1	C1 for reason why the sample is biased eg <ul style="list-style-type: none"> • they are only in the CD store, • the people in the store are more likely to buy CDs • she needs to ask people outside the store oe

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Question		Working						Answer	Mark	Notes
4	(a)	x	-2	-1	0	1	2	3, 7, 9	2	B2 for all three values correct in the table (B1 for 2 values correct)
		y	(1)	3	(5)	7	9			
	(b)							graph of $y = 2x + 5$	2	<p>(From their table of values) M1 ft for plotting at least 2 of their points (any points from their table must be correctly plotted) A1 for correct line from $x = -2$ to $x = +2$</p> <p>(Use of $y = mx + c$) M1 for line drawn with gradient of 2 or line drawn with a y intercept of 5 and a positive gradient) A1 for correct line from $x = -2$ to $x = +2$</p>

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Question		Working	Answer	Mark	Notes
5	(a)		$6n - 3$	2	M1 for attempt to establish linear expression in n with coefficient of 6 e.g. $6n + k$ where k is an integer (accept $n = 6n - 3$ for one mark) A1 cao
	(b)		No + Reason	1	C1 ft from their answer to part (a) for decision and explanation eg “stating no and because all the terms in the sequence are odd and 150 is even” or “no and ‘ $6n - 3$ ’ = 150, $n = 153/6$... so n is not an integer” or Continuing the sequence to show terms 147 and 153 and state “no as 150 is not in the sequence” oe

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Question		Working	Answer	Mark	Notes
6	(a)		8	1	B1 for 8 (.00)
	(b)		550	4	<p>M1 for $600 - 200 (= 400)$ M1 for correct method to convert '\$400' to £ M1 (dep on the previous M1) for $800 - '400'$ in £s A1 for value in the range 540 –560</p> <p>OR</p> <p>M1 for correct method to convert \$600 and \$200 to pounds M1 for '375'–'125' M1 (dep on the previous M1) $800 - '250'$ A1 for a value in the range 540-560</p> <p>OR</p> <p>M1 for correct method to convert £800 to dollars M1 for '$1280' + 200 - 600$ M1 (dep on the previous M1) for attempt to convert '\$880' back to £ A1 for value in the range 540 – 560</p>
7	(a)		$6x - 3y$	2	<p>M1 for an attempt to combine terms in x or terms in y correctly eg $5x + x(= 6x)$, $4y - 7y(= - 3y)$ A1 for $6x - 3y$ oe</p>
	(b)	$7x + 14 = 7$ or $x + 2 = 1$ $7x = -7$	$x = -1$	2	<p>M1 for correctly expanding the bracket or an attempt to divide both sides by 7 e.g. $7x + 14$ or $x + 2 = 7 \div 7$ oe A1 cao</p>

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Question		Working	Answer	Mark	Notes
8			09 36	3	<p>M1 for listing 9, 18, 27, 36, 45, ... (at least 3 correct multiples with at most one incorrect) M1 for listing 12, 24, 36, 48, (at least 3 correct multiples with at most one incorrect) A1 for 09 36 or 9 36 (am)</p> <p>OR M1 for listing 9.09 9.18 9.27 9.36 ... (at least 3 correct times with at most one incorrect) M1 for listing 9.12 9.24 9.36 ... (at least 3 correct times with at most one incorrect) A1 for 09 36 or 9 36 (am)</p> <p>OR M1 for $9 = 3 \times 3$ or $12 = 2 \times 2 \times 3$ (could be in factor tree) M1 for $9 = 3 \times 3$ and $12 = 2 \times 2 \times 3$ (could be in a factor tree) A1 for 09 36 or 9 36 (am)</p> <p>SC B2 for 9 36 pm or (after) 36 (minutes) on the answer line</p>
9	(a)		a^9	1	B1 for a^{4+5} or a^9
	(b)		$9e^5f^6$	2	B2 cao (B1 for two of 9, e^{6-1} , f^{8-2} as a product)
	(c)		3	1	B1 (accept ± 3 but not just -3)

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Question	Working	Answer	Mark	Notes
*10	<p>Angle $AED = 38$ <u>alternate angles are equal</u> Angle $ADE = (180 - 38) \div 2 = 71$ $x = 180 - 71$ base <u>angles</u> of an <u>isosceles</u> triangle are <u>equal</u> <u>angles</u> in a <u>triangle</u> add up to <u>180</u> <u>angles</u> on a straight <u>line</u> sum to <u>180</u> OR angle $AEF = 142$ <u>allied angles/co-interior</u> <u>angles</u> add up to <u>180</u> $ADE = 142 \div 2 = 71$ base <u>angles</u> of an <u>isosceles</u> triangle are <u>equal</u> <u>exterior angle</u> of a triangle is <u>equal</u> to the sum of the <u>interior opposite angles</u> , $x = 180 - 71$ <u>angles</u> in a straight <u>line</u> add to <u>180</u> OR Angle $AED = 38$ <u>alternate angles are equal</u> for angles BAE and AED and BAD and ADC (x) Angle $DAE = (180 - 38) \div 2 = 71$ base <u>angles</u> of an <u>isosceles</u> triangle are <u>equal</u> <u>angles</u> in a <u>triangle</u> add up to <u>180</u> Or Angle $AED = 38$ <u>alternate angles are equal</u> Angle $ADE = (180 - 38) \div 2 = 71$ base <u>angles</u> of an <u>isosceles</u> <u>triangle</u> are <u>equal</u> and <u>angles</u> in a <u>triangle</u> sum to <u>180</u> $x = 38 + 71$ <u>alternate angles</u> BAD and $ADC(x)$ are <u>equal</u></p>	$x = 109$	4	B1 for angle $AED = 38$ or $AEF = 142$ M1 for a complete method to find one of the base angles of the isosceles triangle C2 (dep M1) for $x = 109$ with complete reasons (C1 (dep M1) for one reason correctly used and stated)

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Question	Working	Answer	Mark	Notes
11		730	5	<p>M1 for $\frac{5}{100} \times 200 (= 10)$ oe</p> <p>M1 for $\frac{10}{100} \times 350 (= 35)$ oe</p> <p>M1 for $6 \times '10'$ or $4 \times '35'$</p> <p>M1 (dep on M1 earned for a correct method for a percentage calculation) for "60" + "140"+ 530</p> <p>A1 cao</p> <p>Or</p> <p>M1 for $6 \times 200 (= 1200)$ or $4 \times 350 (= 1400)$</p> <p>M1 for $\frac{5}{100} \times "1200" (= 60)$ oe</p> <p>M1 for $\frac{10}{100} \times "1400" (= 140)$ oe</p> <p>M1(dep on M1 earned for a correct method for a percentage calculation) for "60" + "140"+ 530</p> <p>A1 cao</p>

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Question	Working	Answer	Mark	Notes
12		240	4	<p>M1 for 16×2 (= 32 girls) M1 for $16 + '16 \times 2'$ (= 48) M1 (dep on the previous M1) for $(16 + '32') \times 5$ or $(16 + '32') \times (4 + 1)$ A1 cao</p> <p>OR M1 for $1 : 2 = 3$ parts M1 for 5 schools \times 3 parts (= 15 parts) M1 (dep on the previous M1) for '15' parts \times 16 A1 cao</p> <p>SC B2 for 176 given on the answer line</p>
13		54	3	<p>M1 for $180 - 360 \div 5$ or 108 seen as the interior angle of a pentagon M1 (dep on previous M1) for $360 - 2 \times '108' - 90$ A1 for 54 cao</p> <p>OR M1 for $180 \times (5 - 2)$ (= 540) \div 5 or 108 given as the interior angle of a pentagon M1 (dep on previous M1) for $360 - 2 \times '108' - 90$ A1 for 54 cao</p>

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Question		Working	Answer	Mark	Notes
14	(a)		8, 23, 53, 70, 77, 80	1	B1 cao
	(b)		graph	2	M1 ft from their table for at least 5 points plotted correctly at the ends of the intervals provided table values are cumulative, condoning one arithmetic error A1 cao for correct graph with points joined by curve or straight line segments [SC B1 if the shape of the graph is correct and 5 points of their points are not at the ends but consistently within each interval and joined.]
	(c)	Readings at 60 and 20 420 to 440 – 280 to 295	120 – 160	2	M1 (dep on cf graph) for use of either cf = 20 or cf = 60 A1 ft from a cf graph
	(d)	80 – 71 to 74	6 – 9	2	M1 (dep on cf graph) for evidence of reading off the cf axis from £530 0n the wages axis (could be the answer) A1ft for 6 - 9

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Question	Working	Answer	Mark	Notes
15		Required region	4	M1 arc radius 5 cm centre C M1 bisector of angle BAD M1 line 3 cm from DC A1 for correct region identified (see overlay)
16	(a)	820 000	1	B1 cao
	(b)	3.76×10^{-4}	1	B1 cao
	(c)	5×10^8	2	M1 for $2.3 \div 4.6 \times 10^{12-3}$ oe or 500 000 000 or 0.5×10^9 A1 cao (accept 5.0×10^8)
17		$\frac{12}{13}$	3	M1 for multiplying throughout by 10 oe or writing LHS as a single fraction e.g $2(4x - 1) + 5(x + 4) = 3 \times 10$ or $\frac{2(4x-1) + 5(x+4)}{10} \text{ or } \frac{2(4s-1)}{10} + \frac{5(s+4)}{10}$ M1 (dep) for a complete correct method to obtain linear equation of the form $ax = b$ (condone one arithmetic error in multiplying out the bracket) A1 for $\frac{12}{13}$ oe (decimal equivalent is 0.923...)

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Question	Working	Answer	Mark	Notes
18	<p>Q at $(-3, 1), (-6, 1)$ $(-5, 3) (-3, 3)$</p> <p>R at $(-3, -1), (-6, -1),$ $(-5, -3) (-3, -3)$</p>	Rotation 180° about $(-1, 0)$	3	<p>M1 for showing R correctly on the grid without showing Q or for showing Q and R correctly on the grid</p> <p>A1 for rotation of 180°</p> <p>A1 for (centre) $(-1, 0)$</p> <p>Or</p> <p>M1 for showing R correctly on the grid without showing Q or for showing Q and R correctly on the grid</p> <p>A1 for Enlargement Scale Factor -1</p> <p>A1 for centre $(-1, 0)$</p> <p>NB Award no marks for any correct answer from an incorrect diagram or any Accuracy marks if more than one transformation is given</p>
19		68	3	<p>M1 for angle $OBC = 90^\circ$ or angle $OAC = 90^\circ$ (may be marked on the diagram or used in subsequent working)</p> <p>M1 for correct method to find angle BOC or AOC or AOB</p> <p>e.g. angle $BOC = 180 - 90 - 34 (= 56)$</p> <p>or angle $AOC = 180 - 90 - 34 (=56)$</p> <p>or angle $AOB = 180 - 2 \times 34 (= 112)$</p> <p>A1 cao</p> <p>NB (68 must be clearly stated as an answer and not just seen on diagram)</p>

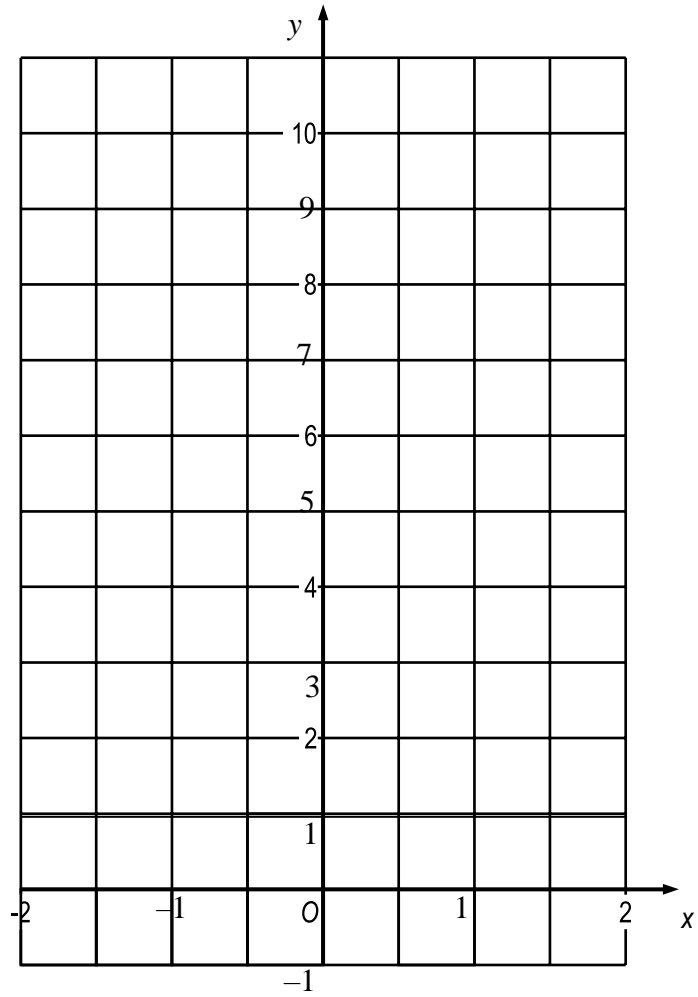
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Question		Working	Answer	Mark	Notes
20	(a)(i)		$(x - 9)(x - 3)$	3	M1 for $(x \pm 9)(x \pm 3)$ A1 for $(x - 9)(x - 3)$
	(ii)		$x = 9, x = 3$		B1 cao
	(b)		$(y + 10)(y - 10)$	1	B1 for $(y + 10)(y - 10)$
*21		$(n + 1)^2 - n^2$ $= n^2 + 2n + 1 - n^2 = 2n + 1$ $(n + 1) + n = 2n + 1$ OR $(n + 1)^2 - n^2$ $= (n + 1 + n)(n + 1 - n)$ $= (2n + 1)(1) = 2n + 1$ $(n + 1) + n = 2n + 1$ OR $n^2 - (n + 1)^2 = n^2 - (n^2 + 2n + 1) =$ $-2n - 1 = -(2n + 1)$ Difference is $2n + 1$ $(n + 1) + n = 2n + 1$	proof	4	M1 for any two consecutive integers expressed algebraically eg n and $n + 1$ M1(dep on M1) for the difference between the squares of 'two consecutive integers' expressed algebraically eg $(n + 1)^2 - n^2$ A1 for correct expansion and simplification of difference of squares, eg $2n + 1$ C1 (dep on M2A1) for showing statement is correct, eg $n + n + 1 = 2n + 1$ and $(n + 1)^2 - n^2 = 2n + 1$ from correct supporting algebra
22		Vertices at $(-2, -4), (-4, -4),$ $(-4, -6), (-2, -5)$	Correct diagram	3	M1 for a similar shape in the correct orientation in the third quadrant M1 for an image in the correct orientation of the correct size A1 cao

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Question	Working	Answer	Mark	Notes
23		75π	3	M1 for $(4 \times \pi \times 5^2) \div 2$ oe M1 for $\pi \times 5^2$ oe A1 for 75π accept 235.5 Condone the use of $\pi = 3.14\dots$
24	EE + CC + HH Or EC+EH+CE+CH+HE+HC Or E,not E+ C,not C + H,not H	$\frac{76}{110}$	5	M1 for use of 10 as denominator for 2 nd probability M1 for $\frac{4}{11} \times \frac{3}{10}$ or $\frac{5}{11} \times \frac{4}{10}$ or $\frac{2}{11} \times \frac{1}{10}$ M1 for $\frac{4}{11} \times \frac{3}{10} + \frac{5}{11} \times \frac{4}{10} + \frac{2}{11} \times \frac{1}{10} = \frac{34}{110}$ M1 (dep on previous M1 for $1 - \frac{34}{110}$) A1 for $\frac{76}{110}$ Or M1 for use of 10 as denominator for 2 nd probability M1 for $\frac{4 \times 5}{11 \times 10}$ or $\frac{4 \times 2}{11 \times 10}$ or $\frac{5 \times 4}{11 \times 10}$ or $\frac{5 \times 2}{11 \times 10}$ or $\frac{2 \times 4}{11 \times 10}$ or $\frac{2 \times 5}{11 \times 10}$ M2 for $\frac{4 \times 5}{11 \times 10} + \frac{4 \times 2}{11 \times 10} + \frac{5 \times 4}{11 \times 10} + \frac{5 \times 2}{11 \times 10} + \frac{2 \times 4}{11 \times 10} + \frac{2 \times 5}{11 \times 10}$ (M1 for at least 3 of these) A1 for $\frac{76}{110}$ Or M1 for use of 10 as denominator for 2 nd probability M1 for $\frac{4}{11} \times \frac{7}{10}$ or $\frac{5}{11} \times \frac{6}{10}$ or $\frac{2}{11} \times \frac{9}{10}$ M2 for $\frac{4}{11} \times \frac{7}{10} + \frac{5}{11} \times \frac{6}{10} + \frac{2}{11} \times \frac{9}{10}$ (M1 for two of these added) A1 for $\frac{76}{110}$ oe PTO for SC's

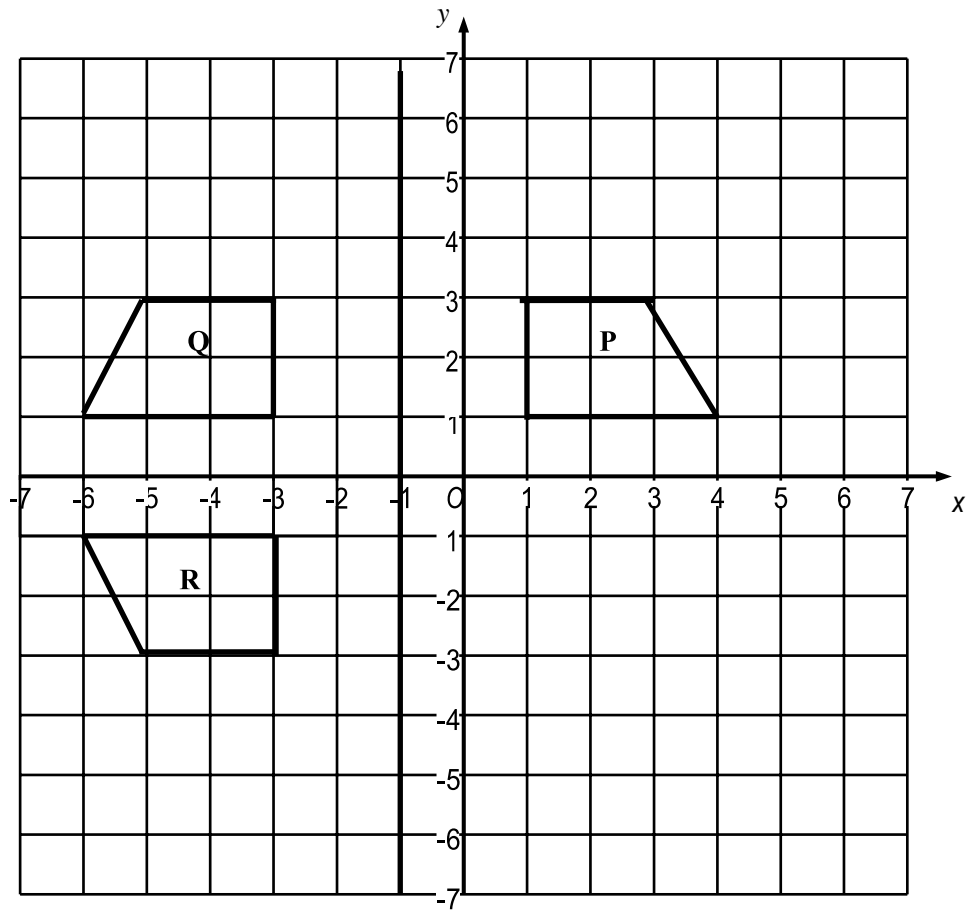
1MA0_1H					
Question		Working	Answer	Mark	Notes
					<p>SC: B2 for $\frac{76}{121}$</p> <p>SC: B1 for $\frac{4}{11} \times \frac{4}{11} + \frac{5}{11} \times \frac{5}{11} + \frac{2}{11} \times \frac{2}{11} (= \frac{45}{121})$</p> <p>Or</p> $\frac{4}{11} \times \frac{5}{11} + \frac{4}{11} \times \frac{2}{11} + \frac{5}{11} \times \frac{4}{11} + \frac{5}{11} \times \frac{2}{11} + \frac{2}{11} \times \frac{4}{11} + \frac{2}{11} \times \frac{5}{11} \quad \frac{4}{11} \frac{5}{11}$ <p>Or</p> $\frac{4}{11} \times \frac{7}{11} + \frac{5}{11} \times \frac{6}{11} + \frac{2}{11} \times \frac{9}{11} \quad \frac{4}{11} \frac{5}{11}$
25	(a)		sketch		<p>M1 for inverting the parabola, so maximum is at $(-2, 0)$</p> <p>A1 for parabola passing through all three of the points $(-2, 0)$, $(0, -4)$, $(-4, -4)$</p>
	(b)		$y = f(x - 6)$	1	B1 for $y = f(x - 6)$ or $y = (x - 4)^2$ oe

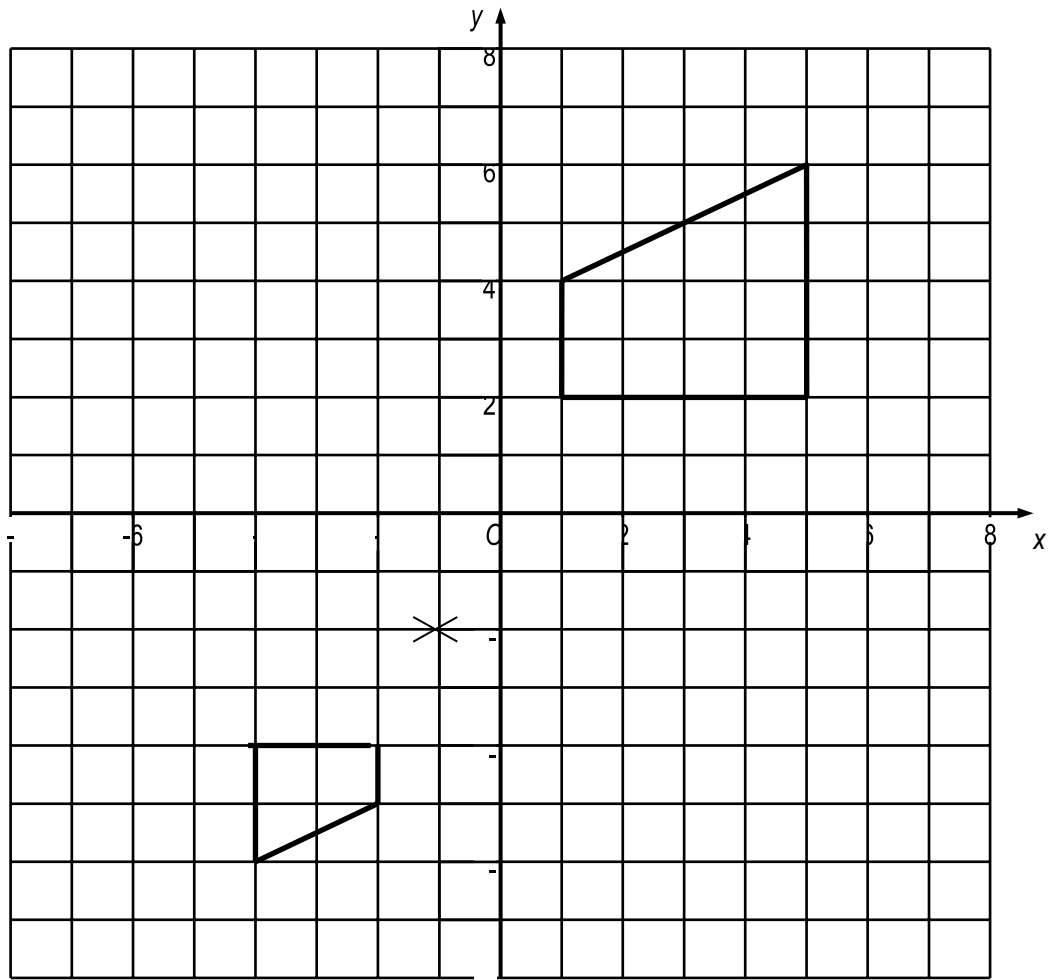
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Question		Working	Answer	Mark	Notes
26	(a)		$6\mathbf{b} - 3\mathbf{a}$	1	B1 for $6\mathbf{b} - 3\mathbf{a}$ oe
	(b)			4	<p>M1 for $AX = \frac{1}{3}AB$ or $\frac{1}{3}(6\mathbf{b} - 3\mathbf{a})$ or ft to $2\mathbf{b} - \mathbf{a}$</p> <p>M1 for $OY = OB + BY = 6\mathbf{b} + 5\mathbf{a} - \mathbf{b} (= 5\mathbf{b} + 5\mathbf{a})$ oe</p> <p>M1 for $OX = 3\mathbf{a} + '2\mathbf{b} - \mathbf{a}' = 2\mathbf{a} + 2\mathbf{b}$ oe</p> <p>Or</p> $OX = 6\mathbf{b} - \frac{2}{3}(6\mathbf{b} - 3\mathbf{a}) (= 2\mathbf{a} + 2\mathbf{b})$ oe <p>C1 for $\frac{2}{5}\overrightarrow{OY} = \frac{2}{5} \times 5(\mathbf{a} + \mathbf{b}) = 2(\mathbf{a} + \mathbf{b}) = \overrightarrow{OX}$</p>

4.



18.





25(a)

