Question	Answer	Marks	AO Element	Notes	Guidance
1	correct reflection	**2**		**B1** for 5 vertices correct	
2	Correct ruled enlargement	**2**		**B1** for two sides correct or for enlargement incorrect scale factor	
3	Correct enlargement drawn	**2**		**B1** for correct sf but wrong position	
4(a)	Triangle at (–1, 1) (–4, 2) (–3, 5)	**1**			
4(b)	Triangle at (–2, –3) (1, –2) (0, 1)	**2**		**B1** for translation by $\begin{pmatrix} -3 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ -4 \end{pmatrix}$	
5	Rotation clockwise 90° [centre] (0, 0)	**3**		**B1** for each	
6(a)	Triangle at (–4, –4) (–1, –3) (–4, –3)	**2**		**B1** for correct points not joined or for reflection in any $y = k$ or for reflection in $x = -1$	

Question	Answer	Marks	AO Element	Notes	Guidance
6(b)	Triangle at (1, 1) (1, 4) (2, 4)	2		**B1** for correct points not joined or rotation 90° clockwise around any point or rotation 90° anticlockwise around (0, 0)	
6(c)	Translation $\begin{pmatrix} 5 \\ -6 \end{pmatrix}$	2		**B1** for translation or correct vector oe	
7(a)(i)	triangle with vertices at (−2, −1) (−8, −1) (−2, −5)	2		**B1** for correct reflection in $y = x$	
7(a)(ii)	triangle with vertices at (−1, −1) (−1, −7) (3, −7)	2		**B1** for translation by $\begin{pmatrix} k \\ -9 \end{pmatrix}$ or $\begin{pmatrix} -2 \\ k \end{pmatrix}$	
7(b)(i)	Enlargement [centre] (−7, 8) [sf] ½	3		**B1** for each	
7(b)(ii)	Rotation [centre] (0, 0) 90° clockwise oe	3		**B1** for each	

Question	Answer	Marks	AO Element	Notes	Guidance
8(a)(i)	Rotation [centre] (0, 0) oe 90° [anticlockwise] oe	**3**		**B1** for each	
8(a)(ii)	Translation $\begin{pmatrix} -6 \\ -3 \end{pmatrix}$	**2**		**B1** for each	
8(a)(iii)	Enlargement [centre] (6, 4) [sf] 3	**3**		**B1** for each	
8(b)	Correct reflection (2, −3), (2, −4), (5, −3)	**2**		**B1** for correct reflection in $y = k$	
9	Image at (1, 2), (1, 5), (3, 5), (3, 4)	**2**		**B1** for $y = x$ drawn or for 3 correct points	
10	correctly enlarged triangle	**2**		**M1** for an enlargement scale factor 3 but incorrect position	
11(a)	Translation $\begin{pmatrix} -4 \\ 2 \end{pmatrix}$	**2**		**B1** for each	

Question	Answer	Marks	AO Element	Notes	Guidance
11(b)	Correct reflection vertices (3, –3), (1, –3), (3, –4)	**2**		**B1** for reflection in line $x = -1$ or $y = k$	
11(c)	Correct rotation vertices (–3, –1), (–1, –1), (–3, –2)	**2**		**B1** for correct orientation but wrong position	
12	Enlargement [sf] $-\dfrac{1}{2}$ [centre] (4, 4)	**3**		**B1** for each	
13(a)	Translation $\begin{pmatrix} -1 \\ -8 \end{pmatrix}$	**2**		**B1** for each	
13(b)	Image at (–1, –1), (–4, –1), (–1, –2)	**2**		**B1** for image correct scale factor and orientation but wrong position or for enlargement scale factor $\dfrac{1}{2}$ centre (0, 0)	
14(a)(i)	rotation 90 anticlockwise oe (–3, 2)	**3**		**B1** for each	

Question	Answer	Marks	AO Element	Notes	Guidance
14(a)(ii)	enlargement $-\dfrac{1}{2}$ $(-2, -1)$	3		**B1** for each	
14(b)	Image at $(-3, -5)$ $(1, -5)$ $(1, 3)$	2		**B1** for translation by $\begin{pmatrix} -5 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ -10 \end{pmatrix}$	
14(c)	Image at $(2, 3)$ $(6, 3)$ $(6, -5)$	2		**B1** for reflection in $y = k$ or $x = 4$	
15(a)(i)	Translation $\begin{pmatrix} 5 \\ 8 \end{pmatrix}$	2		**B1** for each Accept 5 right and 8 up	
15(a)(ii)	Enlargement [sf] 0.5 oe [centre] $(0, -7)$	3		**B1** for each	
15(a)(iii)	Rotation 90 [anticlockwise] oe Origin oe	3		**B1** for each	

Question	Answer	Marks	AO Element	Notes	Guidance
15(b)	Image at (−8, 1) (−8, 5) (−8, 7) (−4, 1)	**2**		**B1** for reflection of flag *A* in the line $x = -1$ or $y = k$ or for vertices of triangle in correct place but not joined	
16	Enlargement [scale factor] $-\dfrac{1}{2}$ [centre] (3, 4)	**3**		**B1** for each	
17(a)	Rotation 90° clockwise oe (1, 0)	**3**		**B1** for each	
17(b)	Enlargement −2 (0, 2)	**3**		**B1** for each	
18(a)	Image at (1, 7), (4, 7), (4, 9), (3, 9)	**2**		**B1** for translation by $\begin{pmatrix} -1 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ 6 \end{pmatrix}$	
18(b)	Image at (5, 3), (6, 3), (8, 5), (5, 5)	**2**		**B1** for 180° rotation with wrong centre	

Question	Answer	Marks	AO Element	Notes	Guidance
18(c)	Rotation 180° (4.5, 6) OR Enlargement [factor] −1 (4.5, 6)	3		**B1** for rotation **B1** for 180° **B1FT** for centre from *their* (a) **B1** for enlargement **B1** for −1 **B1FT** for centre from *their* (a)	
19(a)(i)	Image at (−5, 4), (−2, 4), (−4, 6)	2		**B1** for translation by $\begin{pmatrix} -3 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ 2 \end{pmatrix}$	
19(a)(ii)	Image at (2, 1), (4, −1), (2, −2)	2		**B1** for reflection in $y = -x$ or $y = x$ drawn	
19(b)	Rotation 90° [anticlockwise] oe (1, −1)	3		**B1** for each	
20(a)(i)	Reflection $x = 1.5$	2		**B1** for each	
20(a)(ii)	Rotation (0, −1) 90° [anticlockwise] oe	3		**B1** for each	

Question	Answer	Marks	AO Element	Notes	Guidance
20(b)(i)	Image at $(5, -1)$ $(6, -1)$ $(6, -3)$	**2**		**B1** for correct size and orientation but wrong position If 0 scored, **SC1** for enlargement SF $\frac{1}{2}$ with centre $(3, 0)$	
20(b)(ii)	Image at $(-6, 3)$ $(-4, 3)$ $(-6, 7)$	**2**		**B1** for translation $\begin{pmatrix} -3 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ 1 \end{pmatrix}$	
21(a)	Reflection $y = -1$	**2**		**B1** for each	
21(b)	Triangle at $(0, -3), (4, -1), (4, -3)$	**2**		**B1** for translation $\begin{pmatrix} -2 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ -5 \end{pmatrix}$ or for three correct vertices	
21(c)	Triangle at $(-2, 2), (-2, 6), (-4, 6)$	**2**		**B1** for rotation about $(0, 0)$ 90° clockwise or 90° anticlockwise with wrong centre or for three correct vertices	

Question	Answer	Marks	AO Element	Notes	Guidance
21(d)	Triangle at (–3, –1), (–3, –2), (–1, –1)	2		**B1** for scale factor $-\frac{1}{2}$ with wrong centre or scale factor $\frac{1}{2}$ with centre (0, 0) or for three correct vertices	
22(a)	Enlargement [scale factor] 2 [centre] (7, 0)	3		**B1** for each	
22(b)	Image at (6, 4), (7, 4), (6, 8)	3		**B2** for rotation through 90° clockwise but about other point or **B1** for rotation through 90° anticlockwise about any point or for triangle at (6, 4), (7, 4), (6, k)	
23(a)(i)	Image at (3, –3), (7, –3), (7, –5)	2		**B1** for reflection in any $x = k$ or if 3 correct points not joined	

Question	Answer	Marks	AO Element	Notes	Guidance
23(a)(ii)	Image at (–5, 1), (–1, 1), (–5, –1)	2		**B1** for translation by $\begin{pmatrix} -2 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ 4 \end{pmatrix}$ or if 3 correct points not joined	
23(a)(iii)	Image at (6, 3), (6, 4), (4, 3)	3		**B2** for correct size and orientation but wrong position or if 3 correct points not joined **B1** for enlargement SF ½ with centre (3, 1)	
23(b)	Rotation 90° [anticlockwise] oe (–6, –2)	3		**B1** for each	
24(a)	Rotation [centre] origin oe 90°[anti-clockwise] oe	3		**B1** for each	
24(b)	Enlargement [centre] (0, 3) [sf] – 2	3		**B1** for each	
25	Enlargement	1			

Question	Answer	Marks	AO Element	Notes	Guidance
	$\dfrac{1}{2}$	**1**			
	origin oe	**1**			
					[Total: 140]