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Topical Worksheets for Cambridge O LEVEL Mathematics D (4024)

Transformations

Mark Scheme

1st edition, for examination until 2025

Question	Answer	Marks	AO Element	Notes	Guidance
1(a)	Kite	**1**			
1(b)(i)	Translation $\begin{pmatrix} 4 \\ 9 \end{pmatrix}$	**2**		**B1** for each	
1(b)(ii)	Reflection $x = 0.5$ oe	**2**		**B1** for each	
1(b)(iii)	Rotation 90° clockwise oe [centre] (0, 0) oe	**3**		**B1** for each	
1(c)(i)	(−5, −6)	**1**			
1(c)(ii)	Image at (−5, 0), (−2, 3), (7, 0),(−2, −3)	**2**		**B1** for correct size, wrong position or correct shape with incorrect scale factor	
2(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
2(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)	
2(c)	Translation $\begin{pmatrix} 5 \\ -6 \end{pmatrix}$	**2**		**B1** for translation or correct vector oe	
3(a)	Translation $\begin{pmatrix} -1 \\ -5 \end{pmatrix}$	**2**		**B1** for each	
3(b)	Correct reflection at (6, 2), (6, 6), (7, 6), (7, 3)	**2**		**B1** for three correct vertices	
4(a)(i)	Rotation 90° clockwise oe [centre] (0, 0) oe	**3**		**B1** for each	
4(a)(ii)	Enlargement [sf] 0.5 oe [centre] (1, 2)	**3**		**B1** for each	

Question	Answer	Marks	AO Element	Notes	Guidance
4(b)(i)	Triangle at (3, 2) (1, 5) (1, 2)	**2**		**B1** for translation of $\begin{pmatrix} 6 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ -2 \end{pmatrix}$	
4(b)(ii)	Triangle at (–3, –2) (–5, –2) (–5, –5)	**2**		**B1** for reflection in $y = k$ or $x = 1$	
5(a)	Rotation 90° clockwise oe (1, 0)	**3**		**B1** for each	
5(b)	Enlargement –2 (0, 2)	**3**		**B1** for each	
6(a)	Trapezium	**1**			
6(b)(i)	16 or 15.8 to 16.2	**1**			
6(b)(ii)	14	**1**			
6(c)(i)	Translation $\begin{pmatrix} -9 \\ -8 \end{pmatrix}$	**2**		**B1** for each	

Question	Answer	Marks	AO Element	Notes	Guidance
6(c)(ii)	Rotation 90° clockwise oe [about] (0, 0) oe	**3**		**B1** for each	
6(d)(i)	Correct shape Vertices (−1, 4), (−1, 6), (−5, 6), (−5, 1)	**2**		**B1** for reflection in $x = k$ or $y = 1$	
6(d)(ii)	Correct shape Vertices (3, 0.5), (3, 3), (1, 3), (1, 2)	**2**		**B1** for any enlargement, SF $\frac{1}{2}$ with different centre	
7(a)	Rotation [centre] (0, 0) oe 90[°] clockwise oe	**3**		**B1** for each	
7(b)	Enlargement [centre] (5, −7) [sf =] 3	**3**		**B1** for each	
7(c)	Correct shape plotted with points (6, −1) (8, −1) (6, −3) (8, −3) (6, −5)	**2**		**B1** for a correct translation of $\begin{pmatrix} 3 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ 1 \end{pmatrix}$	
7(d)	Correct shape plotted with points (−2, 5) (−6, 5) (−2, 7) (−4, 5) (−4, 7)	**2**		**B1** for reflection in $y = k$ or $x = 1$	

Question	Answer	Marks	AO Element	Notes	Guidance
8(a)(i)	16	**1**			
8(a)(ii)	12	**1**			
8(b)(i)	(5, 2)	**1**			
8(b)(ii)A	(−5, 2)	**1**			
8(b)(ii)B	(5, 10)	**2**		**B1** for (5, k) or (7, 2)	
8(b)(iii)	$\begin{pmatrix} 44 \\ -14 \end{pmatrix}$	**2**		**FT** *their* **(b)(i)** **B1** for $\begin{pmatrix} 44 \\ k \end{pmatrix}$ or $\begin{pmatrix} 49 - their5 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ -14 \end{pmatrix}$ or $\begin{pmatrix} k \\ -12 - their2 \end{pmatrix}$	
8(c)(i)	Enlargement (SF) 0.5 oe (centre) (−3, 1)	**3**		**B1** for each	

Question	Answer	Marks	AO Element	Notes	Guidance
8(c)(ii)	Rotation 180° (centre) (4, 8)	**3**		**B1** for each	
9(a)	Image at (1, 7), (4, 7), (4, 9), (3, 9)	**2**		**B1** for translation by $\begin{pmatrix} -1 \\ k \end{pmatrix}$ or $\begin{pmatrix} k \\ 6 \end{pmatrix}$	
9(b)	Image at (5, 3), (6, 3), (8, 5), (5, 5)	**2**		**B1** for 180° rotation with wrong centre	
9(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)	
10	Image at (1, 2), (1, 5), (3, 5), (3, 4)	**2**		**B1** for $y = x$ drawn or for 3 correct points	
					[Total: 82]