

## Topic 18 Vectors and transformations (Post-TT) [27] MARKSCHEME

1.

$\begin{pmatrix} 7 \\ -5 \end{pmatrix}$	<b>B1</b>
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2.

(a)		$(-2, -2)(-6, -2)$ $(-2, -4)(-4, -4)$	M1 Shape drawn in correct orientation A1
(b)		Enlargement sf $-0.5$ centre $(0,0)$	C1

3.

(a)  $\mathbf{a} + 2\mathbf{b}$  B1  
*oe*

(b)  $2\mathbf{b} - 3\mathbf{a}$  B1  
*oe*

*Note:  $\begin{pmatrix} a \\ 2b \end{pmatrix}$  and  $\begin{pmatrix} -3a \\ 2b \end{pmatrix}$  correct scores SCI*

(c)  $\frac{SR}{UT}$  B1  
B1

[4]

4.

(a)  $\frac{1}{2}$  B1

(b)  $(-2, -1)$  B1

*Reading from graph 1 mm tolerance rule applies  
 $\pm 0.2$*

[2]

5.

i(a)	$\vec{BC} = 2\mathbf{a} - 3\mathbf{b}$ or $\vec{CB} = -2\mathbf{a} + 3\mathbf{b}$ or $\vec{AM} = \mathbf{a}$ or $\vec{MA} = -\mathbf{a}$ or $\vec{BN} = \frac{2}{5}\vec{BC}$ or $\vec{CN} = -\frac{3}{5}\vec{BC}$	M1	oe
	$\mathbf{a} + \frac{3}{5}(-2\mathbf{a} + 3\mathbf{b})$ or $-\mathbf{a} + 3\mathbf{b} + \frac{2}{5}(2\mathbf{a} - 3\mathbf{b})$	M1	oe
	$-\frac{1}{5}\mathbf{a} + \frac{9}{5}\mathbf{b}$	A1	oe eg $-0.2\mathbf{a} + 1.8\mathbf{b}$ or $\frac{1}{5}(9\mathbf{b} - \mathbf{a})$ Must collect terms
i(b)	$\vec{MN}$ is not a multiple of $\vec{AB}$	B1ft	oe

6.

- (a) Reflection B1  
 (in line)  $y = x$  B1
- (b) Translation left 4, down 3 B2  
*Allow B1 for left 3 down 4*  
*Note: If evidence of triangle D used, treat as misread - 1*
- Their translated triangle rotated through  $90^\circ$  anticlockwise M1  
*Allow even if not about (0, -2)*
- Correct final position A1  
*Correct position for C (0, -2), (0, -4), (-3, -2)*  
*Correct position for D (misread B1 M1 A1) (-1, -5), (-3, -5), (-3, -2)*

[6]

7.

- (a)  $\frac{1}{3}((4\mathbf{a} - 5\mathbf{b}) + (5\mathbf{a} - \mathbf{b}))$  M1  
 $(-4\mathbf{a} + 5\mathbf{b}) + \text{their } (3\mathbf{a} - 2\mathbf{b})$  M1 dep  
 $-\mathbf{a} + 3\mathbf{b}$  A1  
*or  $3\mathbf{a} - 2\mathbf{b}$*
- (b)  $(-4\mathbf{a} + 5\mathbf{b}) + (\mathbf{a} + 4\mathbf{b})$  M1  
 $-3\mathbf{a} + 9\mathbf{b}$  A1
- (c) ORS is a straight line B1  
*oe*
- OS is 3 times the length of OR B1  
*oe*

[7]