MEMORANDUM

Name: ..... Class: .....

Date: .....

MARK ____ / 20

Answer all questions. Show all your working — marks are awarded for method as well as the final answer. **Teacher copy: accept any correct equivalent method.**

1 Reflect $(3\ ;\ 5)$ in the x-axis. **(1)**

$(3\ ;\ -5)$ ✓ (1)

2 Reflect $(-2\ ;\ 7)$ in the y-axis. **(1)**

$(2\ ;\ 7)$ ✓ (1)

3 Reflect $(4\ ;\ 1)$ in the line $y = x$. **(1)**

$(1\ ;\ 4)$ ✓ (1)

4 Rotate $(3\ ;\ -6)$ by $180°$ about the origin. **(1)**

$(-3\ ;\ 6)$ ✓ (1)

5 Rotate $(4\ ;\ 1)$ by $90°$ CLOCKWISE about the origin. **(2)**

Swap, then make the second coordinate negative: $(x\ ;\ y) \rightarrow (y\ ;\ -x)$ *(1)*
$(1\ ;\ -4)$ *(1)* ✓✓ (2)

6 Rotate $(-2\ ;\ 5)$ by $90°$ ANTICLOCKWISE about the origin. **(2)**

$(x\ ;\ y) \rightarrow (-y\ ;\ x)$ *(1)*
$(-5\ ;\ -2)$ *(1)* ✓✓ (2)

7 Rotate $(3\ ;\ -1)$ by $270°$ clockwise about the origin. **(2)**

$270°$ clockwise is the same as $90°$ anticlockwise *(1)*
$(x\ ;\ y) \rightarrow (-y\ ;\ x)$, so the image is **$(1\ ;\ 3)$** *(1)* ✓✓ (2)

8 Translate $(5\ ;\ 3)$ by 2 left and 4 up. **(2)**

$(3\ ;\ 7)$ ✓✓ (2)

9 A point is reflected in the x-axis; its image is $(6\ ;\ -2)$. Find the original. **(2)**

> **$(6\ ;\ 2)$** ✓✓ (2)

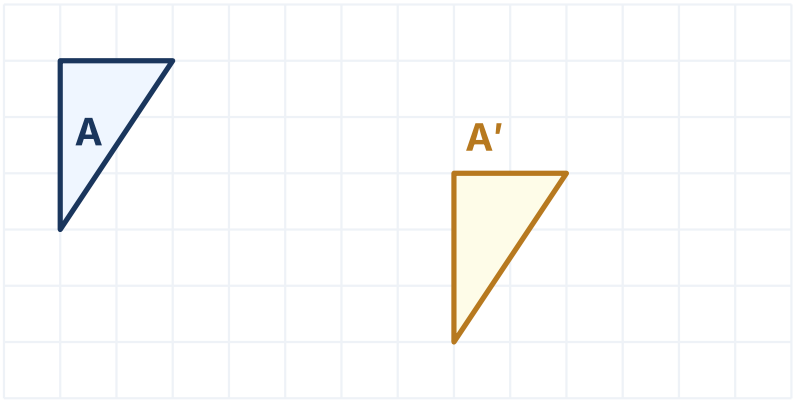
10 Enlarge $(3\ ;\ -4)$ by scale factor 3 from the origin. **(1)**

> **$(9\ ;\ -12)$** ✓ (1)

11 A rectangle 4 cm $\times$ 3 cm is enlarged by factor 3. Find the new area. **(3)**

> $12 \times 3^2 = \mathbf{108\ cm^2}$ ✓✓✓ (3)

12 Which transformations leave the figure congruent? **(2)**



translation: 7 right and 2 down

> **Reflection, translation and rotation** (enlargement changes size). ✓✓ (2)

TOTAL: 20 marks

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