

a Reflect (1, 4) in the y axis, then translate by $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$. Give the new point. $(2, 6)$ a reflection then a translation	b Translate (1, 4) by $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$, then reflect in the y axis. Give the new point. $(-4, 6)$ the other order, another point	c Rotate (3, 2) 90° anticlockwise about (0, 0), then reflect in the x axis. $(-2, -3)$ a quarter turn then a reflection	d Rotate 180° about (0, 0), then reflect in the x axis. Describe this as one. <i>reflection in the y axis</i> a half turn and a reflection as one
e Reflect in $x = 1$, then in $y = 2$. Describe this as one transformation. <i>rotation 180° about (1, 2)</i> perpendicular mirrors off the axes	f Rotate 90° clockwise, then 180° , both about (0, 0). Describe this as one. <i>rotation 90° anticlockwise about (0, 0)</i> two turns about one centre	g Reflect in the y axis, then in $y = x$. Describe this as one transformation. <i>rotation 90° clockwise about (0, 0)</i> mirrors 45° apart: a quarter turn	h Which has no invariant points: a reflection, a rotation or a translation? <i>a translation</i> a translation has no invariant points
i Reflect in the x axis, then translate by $\begin{pmatrix} 0 \\ 4 \end{pmatrix}$. Describe this as one transformation. <i>reflection in $y = 2$</i> a reflection and a translation as one	j Reflect in the x axis, then translate by $\begin{pmatrix} 0 \\ 4 \end{pmatrix}$. Find every invariant point. <i>every point on $y = 2$</i> a line of invariant points	k Rotate 180° about (0, 0), then translate by $\begin{pmatrix} 4 \\ 2 \end{pmatrix}$. Find the invariant point. $(2, 1)$ a turn and a move: the new centre	l Reflect in the x axis, then translate by $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$. Describe how to undo this. <i>translate by $\begin{pmatrix} -3 \\ -2 \end{pmatrix}$, then reflect in $y = 0$</i> undo the last step first

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