TRANSFORMATIONS

A TRANSLATION

A.1 DETERMINING THE IMAGE UNDER A TRANSLATION

Ex 1: Find the coordinates of the image of point $M(1,2)$ under a translation by vector $\vec{v}\begin{pmatrix}2\\1\end{pmatrix}$.

$M'(\square,\square)$

Ex 2: Find the coordinates of the image of point $M(3,2)$ under a translation by vector $\vec{v}\begin{pmatrix}-1.5\\2\end{pmatrix}$.

$M'(\square,\square)$

Ex 3: Find the coordinates of the image of point $M(-2,4)$ under a translation by vector $\vec{v}\begin{pmatrix}5\\-3\end{pmatrix}$.

$M'(\square,\square)$

Ex 4: Find the coordinates of the image of point $M(0,-3)$ under a translation by vector $\vec{v}\begin{pmatrix}-2\\4\end{pmatrix}$.

$M'(\square,\square)$

A.2 DETERMINING THE ORIGINAL POINT UNDER A TRANSLATION

Ex 5: Find the coordinates of the point M whose image is $M'(3,3)$ under a translation by vector $\vec{v}\begin{pmatrix}2\\1\end{pmatrix}$.

$M(\square,\square)$

Ex 6: Find the coordinates of the point M whose image is $M'(1.5,4)$ under a translation by vector $\vec{v}\begin{pmatrix}-1.5\\2\end{pmatrix}$.

$M(\square,\square)$

Ex 7: Find the coordinates of the point M whose image is $M'(3,1)$ under a translation by vector $\vec{v}\begin{pmatrix}5\\-3\end{pmatrix}$.

$M(\square,\square)$

Ex 8: Find the coordinates of the point M whose image is $M'(-2,1)$ under a translation by vector $\vec{v}\begin{pmatrix}-2\\4\end{pmatrix}$.

$M(\square,\square)$

A.3 DETERMINING THE IMAGE OF LINEAR EQUATION UNDER A TRANSLATION

Ex 9: Find the image equation of $y=2x+1$ under a translation by vector $\begin{pmatrix}1\\-1\end{pmatrix}$.

$y=\square$

Ex 10: Find the image equation of $y=-x+1$ under a translation by vector $\begin{pmatrix}-2\\1\end{pmatrix}$.

$y=\square$

Ex 11: Find the image equation of $y=\frac{x}{2}$ under a translation by vector $\begin{pmatrix}-2\\2\end{pmatrix}$.

$y=\square$

B HOMOTHETY

B.1 DETERMINING THE IMAGE UNDER A HOMOTHETY

Ex 12: Find the coordinates of the image point M' of point $M(1,2)$ under a homothety with center $A(0,0)$ and scale factor 2.

$M'(\square,\square)$

Ex 13: Find the coordinates of the image point M' of point $M(2,3)$ under a homothety with center $A(1,1)$ and scale factor -1.

$M'(\square,\square)$

Ex 14: Find the coordinates of the image point M' of point $M(2,3)$ under a homothety with center $A(-1,2)$ and scale factor 3.

$M'(\square,\square)$

B.2 DETERMINING THE ORIGINAL POINT UNDER A HOMOTHETY

Ex 15: Find the coordinates of the point M whose image is $M'(2,4)$ under a homothety with center $A(0,0)$ and scale factor 2.

$M(\square,\square)$

Ex 16: Find the coordinates of the point M whose image is $M'(0,-1)$ under a homothety with center $A(1,1)$ and scale factor -1.

$M(\square,\square)$

Ex 17: Find the coordinates of the point M whose image is $M'(8,5)$ under a homothety with center $A(-1,2)$ and scale factor 3.

$M(\square,\square)$

C SPECIFIC REFLECTIONS

C.1 DETERMINING THE IMAGE UNDER A REFLECTION

Ex 18: Find the coordinates of the image point M' of point $M(1,2)$ under reflection over the x-axis.

$M'($ $\square$, $\square$ $)$

Ex 19: Find the coordinates of the image point M' of point $M(1,2)$ under reflection over the y-axis.

$M'($ $\square$, $\square$ $)$

Ex 20: Find the coordinates of the image point M' of point $M(1,2)$ under reflection over the line $y=x$.

$M'($ $\square$, $\square$ $)$

Ex 21: Find the coordinates of the image point M' of point $M(-2,3)$ under reflection over the x-axis.

$M'($ $\square$, $\square$ $)$

Ex 22: Find the coordinates of the image point M' of point $M(-2,3)$ under reflection over the y-axis.

$M'($ $\square$, $\square$ $)$

Ex 23: Find the coordinates of the image point M' of point $M(-2,3)$ under reflection over the line $y=x$.

$M'($ $\square$, $\square$ $)$

C.2 DETERMINING THE IMAGE OF LINEAR EQUATION UNDER A REFLECTION

Ex 24: Find the image equation of $y=2x+1$ under a reflection over the x-axis.

$y=$ $\square$

Ex 25: Find the image equation of $y=2x+1$ under a reflection over the y-axis.

$y=$ $\square$

Ex 26: Find the image equation of $y=2x+1$ under a reflection over the line $y=x$.

$y=$ $\square$

Ex 27: Find the image equation of $y=\frac{x}{2}-1$ under a reflection over the x-axis.

$y=$ $\square$

Ex 28: Find the image equation of $y=\frac{x}{2}-1$ under a reflection over the y-axis.

$y=$ $\square$

Ex 29: Find the image equation of $y=\frac{x}{2}-1$ under a reflection over the line $y=x$.

$y=$ $\square$

D SPECIFIC ROTATIONS

D.1 DETERMINING THE IMAGE UNDER A ROTATION

Ex 30: Find the coordinates of the image point M' of point $M(1,2)$ under a rotation of 90° (counterclockwise) around the origin.

$M'($ $\square$, $\square$ $)$

Ex 31: Find the coordinates of the image point M' of point $M(1,2)$ under a rotation of -90° (clockwise) around the origin.

$M'($ $\square$, $\square$ $)$

Ex 32: Find the coordinates of the image point M' of point $M(1,2)$ under a rotation of 180° around the origin.

$M'($ $\square$, $\square$ $)$

Ex 33: Find the coordinates of the image point M' of point $M(-3,1)$ under a rotation of 90° (counterclockwise) around the origin.

$M'($ $\square$, $\square$ $)$

Ex 34: Find the coordinates of the image point M' of point $M(-3,1)$ under a rotation of -90° (clockwise) around the origin.

$M'($ $\square$, $\square$ $)$

Ex 35: Find the coordinates of the image point M' of point $M(-3,1)$ under a rotation of 180° around the origin.

$M'($ $\square$, $\square$ $)$

D.2 DETERMINING THE IMAGE OF LINEAR EQUATION UNDER A ROTATION

Ex 36: Find the image equation of $y=2x+1$ under a rotation of 90° (counterclockwise) around the origin.

$y=$ $\square$

Ex 37: Find the image equation of $y=2x+1$ under a rotation of -90° (clockwise) around the origin.

$y=$ $\square$

Ex 38: Find the image equation of $y=2x+1$ under a rotation of 180° around the origin.

$y=$ $\square$