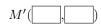
### **TRANSFORMATIONS**

## 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  $\vec{v} \begin{pmatrix} 2 \\ 1 \end{pmatrix}$ .



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



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



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



# 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  $\vec{v} \begin{pmatrix} 2 \\ 1 \end{pmatrix}$ .

$$M($$
\_\_\_\_, $)$ 

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

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

$$M($$
\_\_\_\_\_,\_\_\_)

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

$$M($$
\_\_\_\_\_\_\_)

# 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  $\begin{pmatrix} 1 \\ -1 \end{pmatrix}$ .

$$y =$$

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

$$y =$$

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



### **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.



**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.

**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.

## 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.

**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.

**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.

#### C SPECIFIC REFLECTIONS

#### **DETERMINING IMAGE UNDER C.1** THE REFLECTION

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



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



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



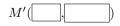
Ex 21: Find the coordinates of the image point M' of point M(-2,3) under reflection over the x-axis.



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



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



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

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



**Ex 25:** Find the image equation of y = 2x + 1 under a reflection **Ex 36:** Find the image equation of y = 2x + 1 under a rotation over the y-axis.

$$y =$$

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

$$y =$$

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

$$y =$$

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

$$y =$$

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

$$y =$$

#### **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.



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



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



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



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



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

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

of 90° (counterclockwise) around the origin.

$$y =$$

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



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

$$y =$$