Common Matrix Transformations

$\begin{bmatrix}\mathbf{1} & \mathbf{0}\\ \mathbf{0} & \mathbf{1}\end{bmatrix}$	**Identity matrix.** **Right remains right, up remains up.**	$\begin{bmatrix}\boldsymbol{x}\\ \boldsymbol{y}\end{bmatrix} \mapsto \begin{bmatrix}\boldsymbol{x}\\ \boldsymbol{y}\end{bmatrix}$
$\begin{bmatrix}-1 & 0\\ 0 & 1\end{bmatrix}$	Reflection in the y-axis. Right has become left, up remains up.	$\begin{bmatrix}x\\ y\end{bmatrix} \mapsto \begin{bmatrix}-x\\ y\end{bmatrix}$
$\begin{bmatrix}1 & 0\\ 0 & -1\end{bmatrix}$	Reflection in the x-axis. Right remains right, up has become down.	$\begin{bmatrix}x\\ y\end{bmatrix} \mapsto \begin{bmatrix}x\\ -y\end{bmatrix}$
$\begin{bmatrix}-1 & 0\\ 0 & -1\end{bmatrix}$	Rotation by $180°$ Right has become left, up has become down.	$\begin{bmatrix}x\\ y\end{bmatrix} \mapsto \begin{bmatrix}-x\\ -y\end{bmatrix}$
$\begin{bmatrix}0 & 1\\ 1 & 0\end{bmatrix}$	Reflection in the line $y = x$. Right has become up, up has become right.	$\begin{bmatrix}x\\ y\end{bmatrix} \mapsto \begin{bmatrix}y\\ x\end{bmatrix}$
$\begin{bmatrix}0 & -1\\ 1 & 0\end{bmatrix}$	Rotation by $90°$ anticlockwise. Right has become up, up has become left.	$\begin{bmatrix}x\\ y\end{bmatrix} \mapsto \begin{bmatrix}-y\\ x\end{bmatrix}$
$\begin{bmatrix}0 & 1\\ -1 & 0\end{bmatrix}$	Rotation by $90°$ clockwise. Right has become down, up has become right.	$\begin{bmatrix}x\\ y\end{bmatrix} \mapsto \begin{bmatrix}y\\ -x\end{bmatrix}$
$\begin{bmatrix}0 & -1\\ -1 & 0\end{bmatrix}$	Reflection in the line $y = -x$. Right has become down, up has become left.	$\begin{bmatrix}x\\ y\end{bmatrix} \mapsto \begin{bmatrix}-y\\ -x\end{bmatrix}$

$\begin{bmatrix}a & 0\\ 0 & 1\end{bmatrix}$	Enlargement by scale factor a in the x direction. Right is multiplied by a, up remains up.	$\begin{bmatrix}x\\ y\end{bmatrix} \mapsto \begin{bmatrix}ax\\ y\end{bmatrix}$
$\begin{bmatrix}1 & 0\\ 0 & a\end{bmatrix}$	Enlargement by scale factor a in the y direction. Right remains right, up is multiplied by a.	$\begin{bmatrix}x\\ y\end{bmatrix} \mapsto \begin{bmatrix}x\\ ay\end{bmatrix}$
$\begin{bmatrix}a & 0\\ 0 & a\end{bmatrix}$	Enlargement by scale factor a from the origin. Right is multiplied by a, up is multiplied by a.	$\begin{bmatrix}x\\ y\end{bmatrix} \mapsto \begin{bmatrix}ax\\ ay\end{bmatrix}$
$\begin{bmatrix}a & 0\\ 0 & b\end{bmatrix}$	Enlargement by scale factor a in the x direction and scale factor b in the y direction. Right is multiplied by a, up is multiplied by b.	$\begin{bmatrix}x\\ y\end{bmatrix} \mapsto \begin{bmatrix}ax\\ by\end{bmatrix}$

Combinations of these matrices give multiple transformations. For instance, two reflections generate a rotation.