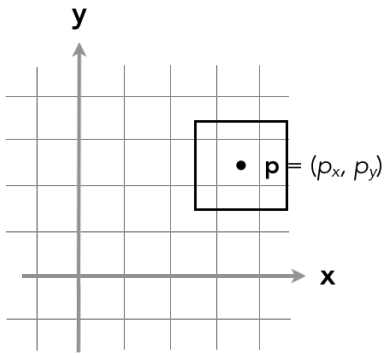
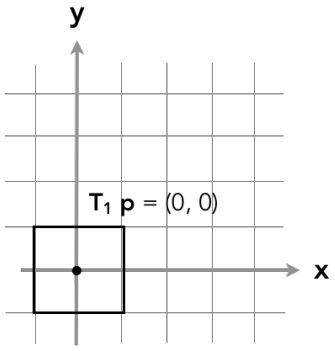
CSCI 480 / 580 – February 5, 2020 – Rotation about a point

1. Write a transformation matrix that translates the point $\mathbf{p} = (p_x, p_y)$ to the origin.

Original Shape *Transformed Shape* *Transformation Matrix*

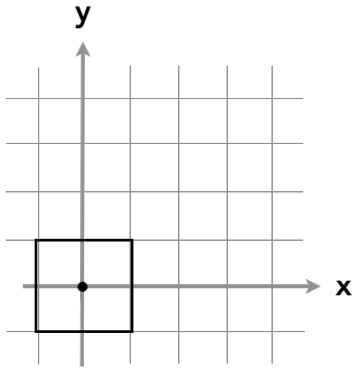


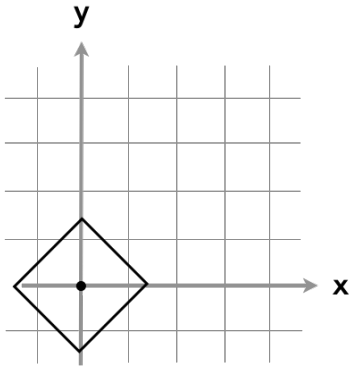


$$\mathbf{T_1} = \begin{bmatrix} & & \\ & & \\ & & \end{bmatrix}$$

1. Write a transformation T_2 that rotates the shape 45 degrees about the origin.

Original Shape *Transformed Shape* *Transformation Matrix*

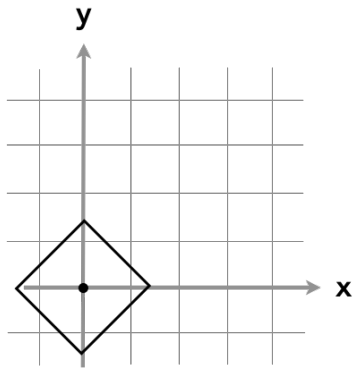


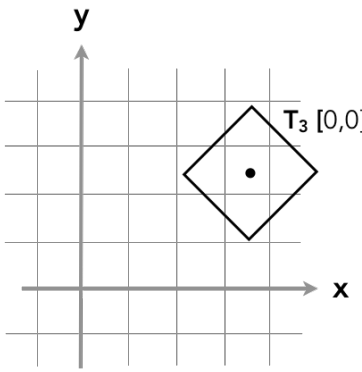


$$\mathbf{T_2} = \begin{bmatrix} & & \\ & & \\ & & \end{bmatrix}$$

2. Write a matrix T_3 that translates the origin back to $\mathbf{p} = (p_x, p_y)$

Original Shape *Transformed Shape* *Transformation Matrix*





$$\mathbf{T_3} = \begin{bmatrix} & & \\ & & \\ & & \end{bmatrix}$$

3. Write the combined transformation matrix to rotate a shape about the point $\mathbf{p}$ in terms of a matrix product involving $\mathbf{T_1}$, $\mathbf{T_2}$, and $\mathbf{T_3}$.