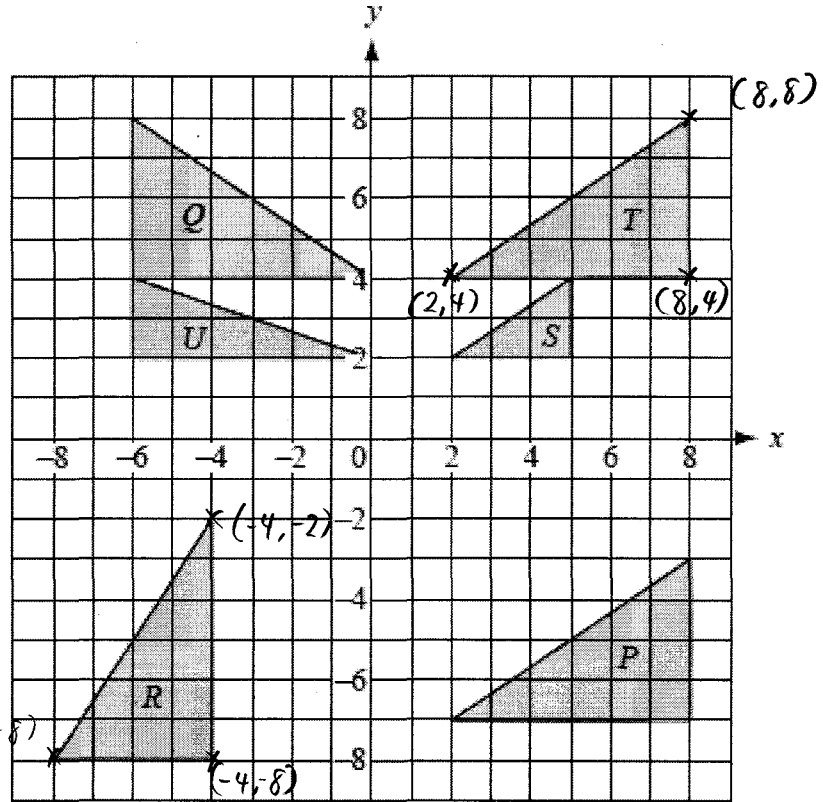


- (b) Find the 2 by 2 matrix representing the transformation which maps triangle
 (i) T onto R, [2]
 (ii) U onto Q. [2]

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Use

$$\begin{bmatrix} T. \text{ matrix} \end{bmatrix} \begin{bmatrix} x_1 \\ y_1 \end{bmatrix} = \begin{bmatrix} x_2 \\ y_2 \end{bmatrix}$$

original point
new point

- b) T is transformed to R.
 (2, 4) is transformed to (-4, -2)
 (8, 4) is transformed to (-4, -8)

Let the transformation matrix be $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix} \begin{pmatrix} x_1 \\ y_1 \end{pmatrix} = \begin{pmatrix} x_2 \\ y_2 \end{pmatrix}$$

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix} \begin{pmatrix} 2 \\ 4 \end{pmatrix} = \begin{pmatrix} -4 \\ -2 \end{pmatrix} \quad \left. \vphantom{\begin{pmatrix} a & b \\ c & d \end{pmatrix} \begin{pmatrix} 2 \\ 4 \end{pmatrix} = \begin{pmatrix} -4 \\ -2 \end{pmatrix}} \right\} \text{first point}$$

$$\begin{pmatrix} 2a + 4b \\ 2c + 4d \end{pmatrix} = \begin{pmatrix} -4 \\ -2 \end{pmatrix}$$

$$2a + 4b = -4 \quad (1)$$

$$2c + 4d = -2 \quad (2)$$

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix} \begin{pmatrix} 8 \\ 4 \end{pmatrix} = \begin{pmatrix} -4 \\ -8 \end{pmatrix}$$

$$\begin{pmatrix} 8a + 4b \\ 8c + 4d \end{pmatrix} = \begin{pmatrix} -4 \\ -8 \end{pmatrix} \quad \left. \vphantom{\begin{pmatrix} 8a + 4b \\ 8c + 4d \end{pmatrix} = \begin{pmatrix} -4 \\ -8 \end{pmatrix}} \right\} \text{2nd point.}$$

$$8a + 4b = -4 \quad (3)$$

$$8c + 4d = -8 \quad (4)$$

Solving (1) & (3)

$$a = 0$$

$$b = -1$$

Solving (2) & (4)

$$c = -1$$

$$d = 0$$