

# Transformations

## Difficulty: Easy

### Question Paper 2

|            |                             |
|------------|-----------------------------|
| Level      | IGCSE                       |
| Subject    | Maths (0580/0980)           |
| Exam Board | CIE                         |
| Topic      | Vectors and transformations |
| Sub-Topic  | Transformations             |
| Paper      | Paper 2                     |
| Difficulty | Easy                        |
| Booklet    | Question Paper 2            |

**Time allowed:** 39 minutes

**Score:** /30

**Percentage:** /100

#### Grade Boundaries:

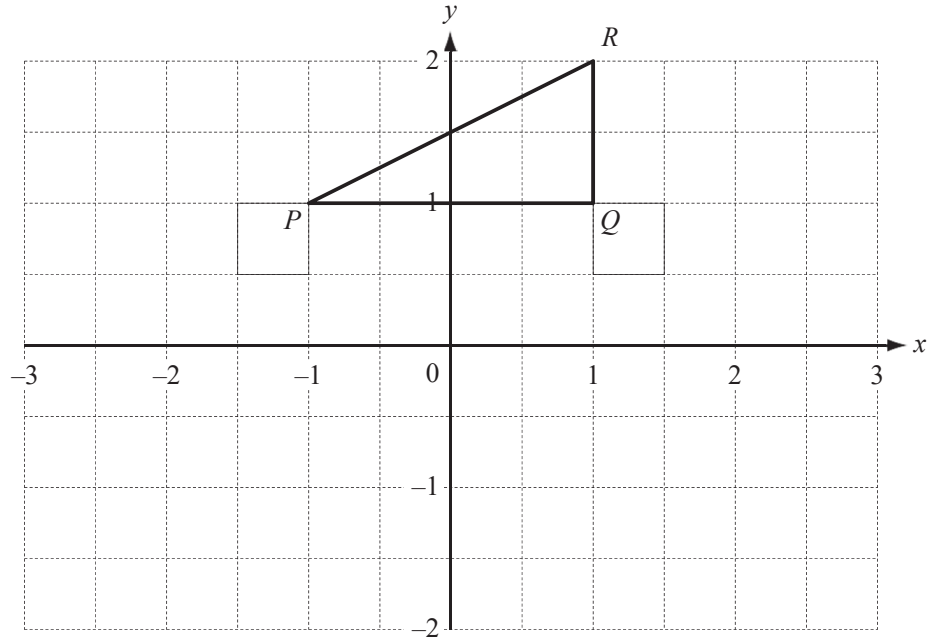
##### CIE IGCSE Maths (0580)

| A*   | A   | B   | C   | D   | E   |
|------|-----|-----|-----|-----|-----|
| >88% | 76% | 63% | 51% | 40% | 30% |

##### CIE IGCSE Maths (0980)

| 9    | 8   | 7   | 6   | 5   | 4   | 3   |
|------|-----|-----|-----|-----|-----|-----|
| >94% | 85% | 77% | 67% | 57% | 47% | 35% |

## Question 1



The triangle  $PQR$  has co-ordinates  $P(-1, 1)$ ,  $Q(1, 1)$  and  $R(1, 2)$ .

- (a) Rotate triangle  $PQR$  by  $90^\circ$  clockwise about  $(0, 0)$ .  
Label your image  $P'Q'R'$ .

[2]

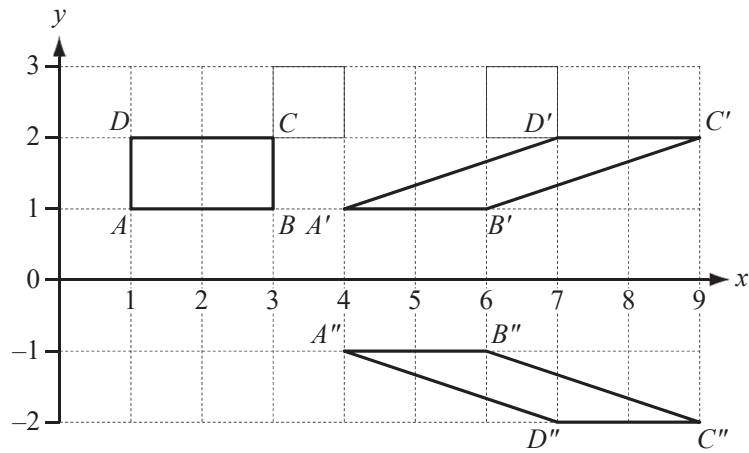
- (b) Reflect your triangle  $P'Q'R'$  in the line  $y = -x$ .  
Label your image  $P''Q''R''$ .

[2]

- (c) Describe fully the single transformation which maps triangle  $PQR$  onto triangle  $P''Q''R''$ .

[2]

## Question 2



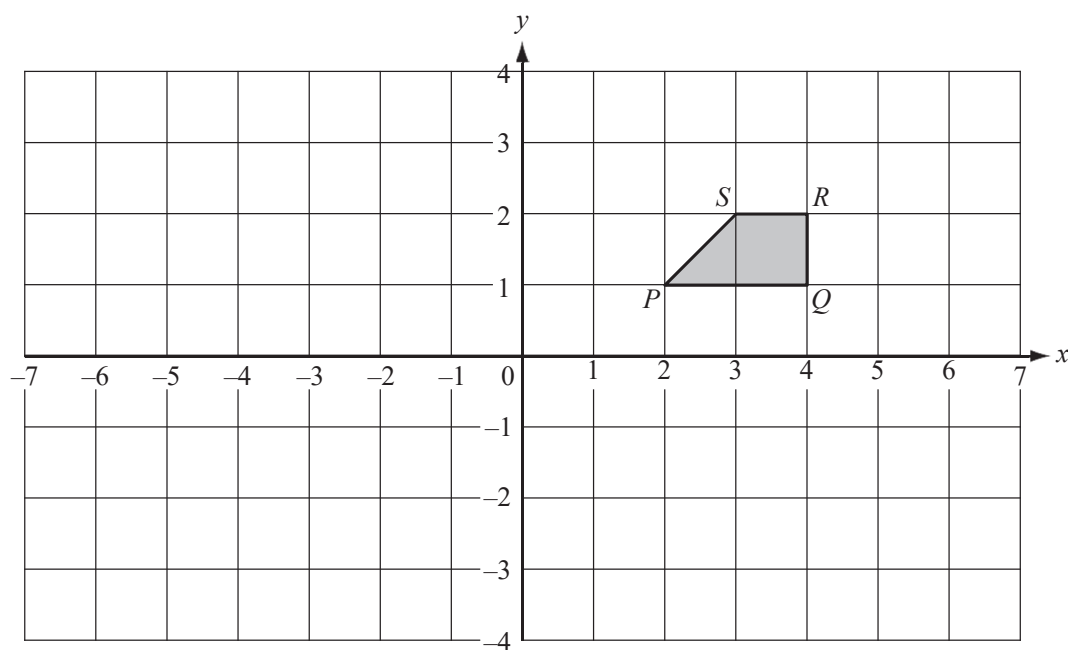
(a) Describe the single transformation which maps  $ABCD$  onto  $A'B'C'D'$ . [3]

(b) A single transformation maps  $A'B'C'D'$  onto  $A''B''C''D''$ .  
 Find the matrix which represents this transformation. [2]

### Question 3

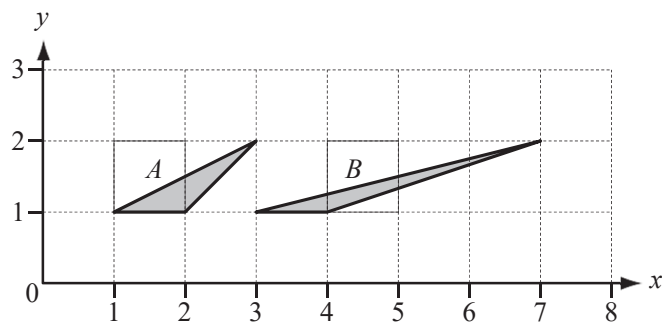
$$\mathbf{A} = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \quad \mathbf{B} = \begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$$

On the grid on the next page, draw the image of  $PQRS$  after the transformation represented by  $\mathbf{BA}$ .



[5]

## Question 4



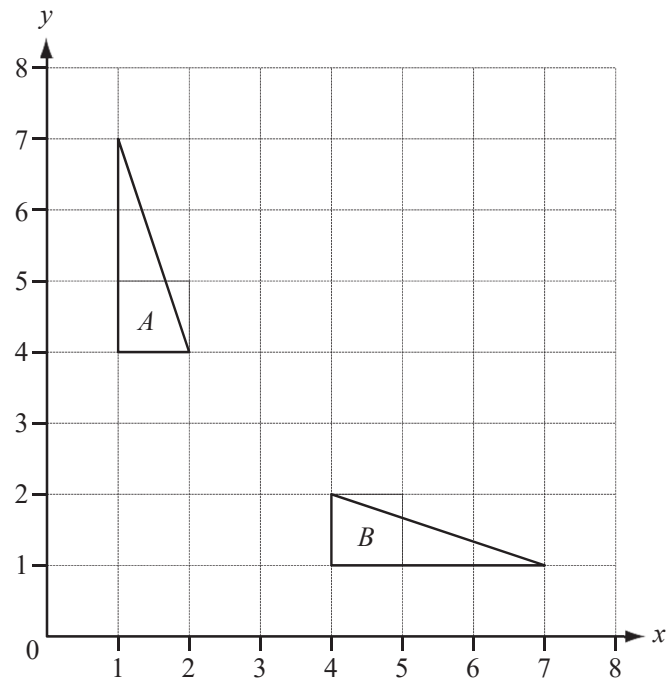
(a) Describe fully the single transformation that maps triangle  $A$  onto triangle  $B$ .

[3]

(b) Find the  $2 \times 2$  matrix which represents this transformation.

[2]

## Question 5



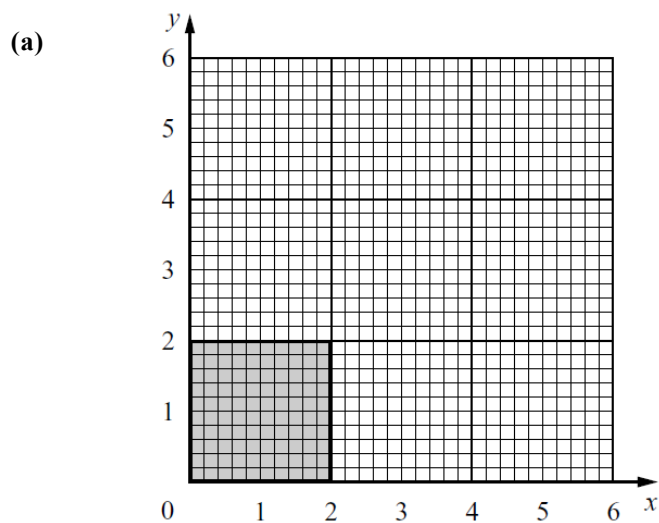
- (a) Describe fully the **single** transformation which maps triangle *A* onto triangle *B*.

[2]

- (b) On the grid, draw the image of triangle *A* after rotation by  $90^\circ$  clockwise about the point (4, 4).

[2]

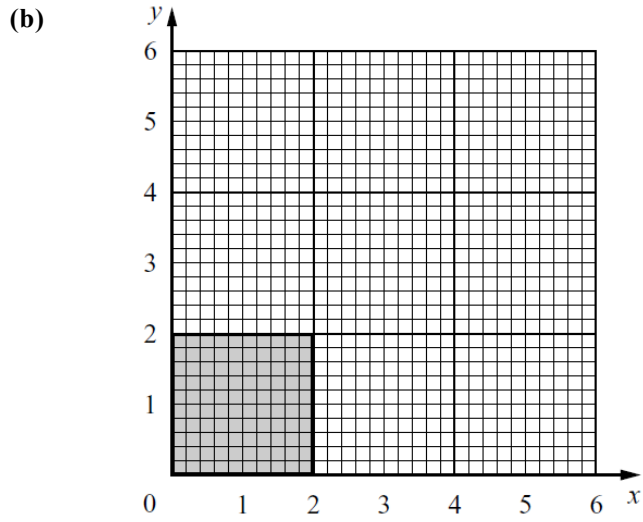
## Question 6



Draw the shear of the shaded square with the  $x$ -axis invariant and the point  $(0, 2)$  mapping onto the point  $(3, 2)$ .

[2]

## Question 6



- (i) Draw the one-way stretch of the shaded square with the  $x$ -axis invariant and the point  $(0, 2)$  mapping onto the point  $(0, 6)$ .

[2]

- (ii) Write down the matrix of this stretch.

[1]