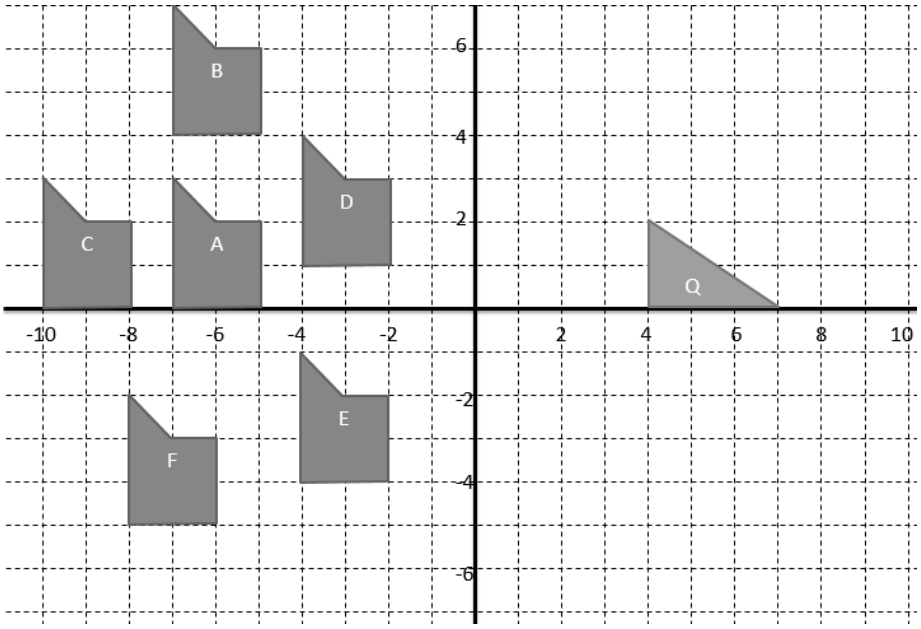
Year 7 Transformations

Section A: Translation

Test Your Understanding



a) Describe (fully) the transformation from:

a. A to B _____

b. A to C _____

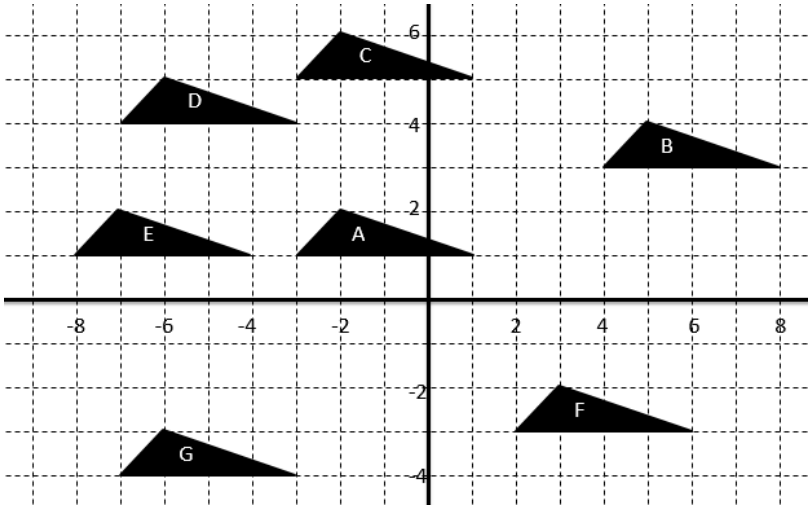
c. A to D _____

d. A to E _____

e. A to F _____

b) Translate shape Q by the vector $\begin{pmatrix} -1 \\ 3 \end{pmatrix}$. Label it R.

Exercise 1 Question 1 : Describe each of the following transformations.



a) A to B

_____

b) A to C

_____

c) A to D

_____

d) A to E

_____

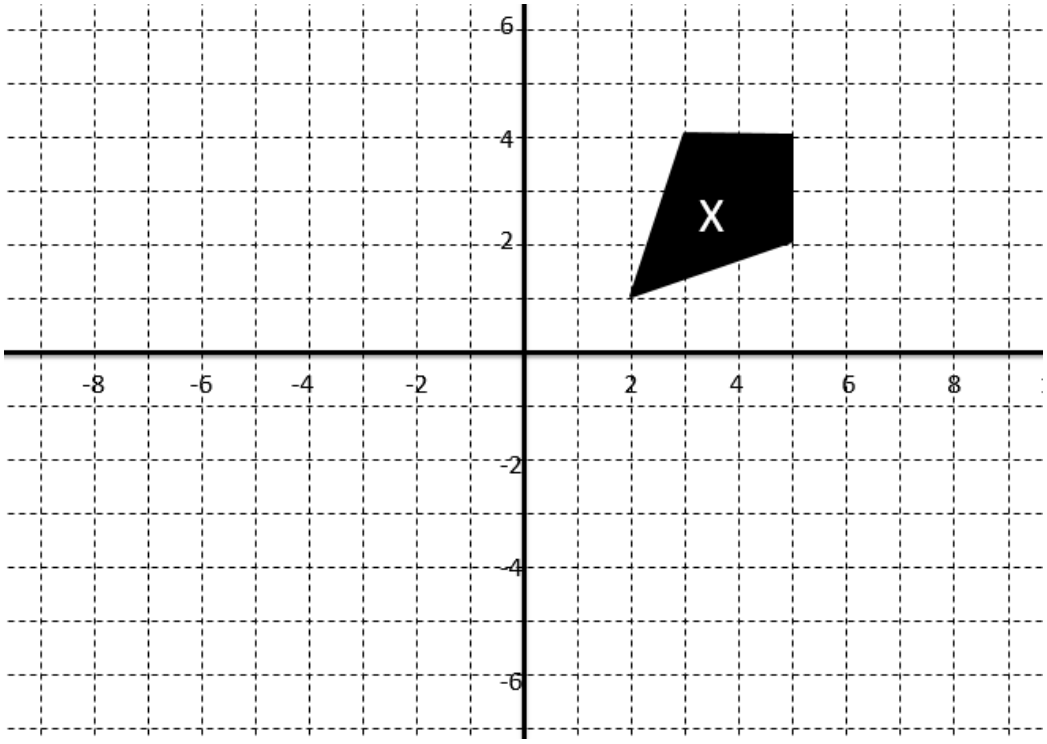
e) A to F

_____

f) A to G

_____

Question 2:



a) Translate X by $\begin{pmatrix} -7 \\ 0 \end{pmatrix}$. Label it A.

b) Translate X by $\begin{pmatrix} 2 \\ -4 \end{pmatrix}$. Label it B.

c) Translate X by $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$. Label it C.

Question 3: A point $(3,1)$ is translated by $\begin{pmatrix} 4 \\ -2 \end{pmatrix}$. What is the image of the point after the transformation?

_____

Question 4: Give a single vector that would be required to translate a point in the way described:

a) Up 3 units. _____

b) Left 2 units. _____

c) Down 7 units and right 6 units. _____

d) Up 1 unit, right 2 units, down 3 units, left 4 units: _____

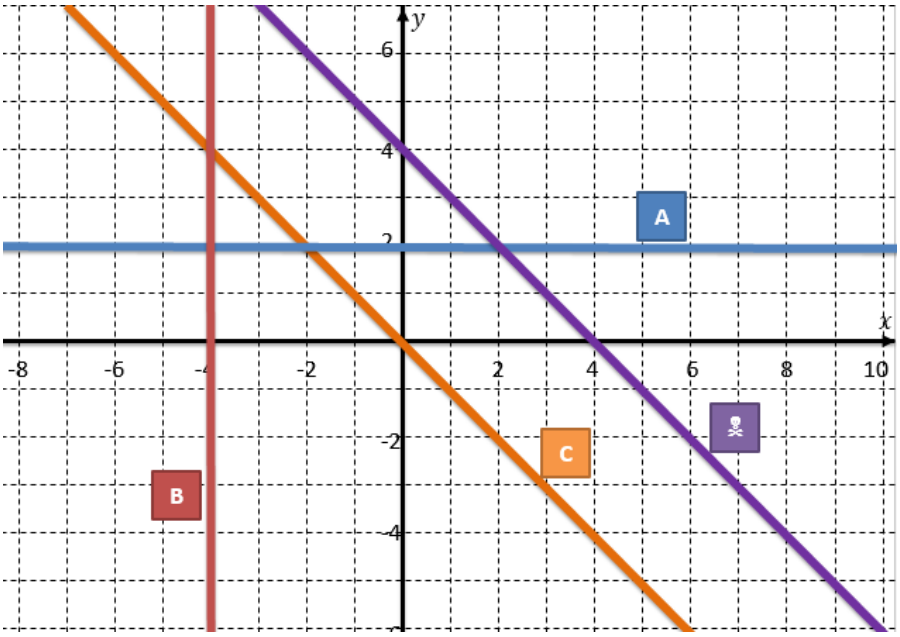
☠ Give a single vector that would be required to translate a point in the way described. Give your vector in terms of the integer n.
Up 1 unit, right 2 units, down 3 units, left 4 units, up 5 units, right 6 units, …
… down $4n - 1$ units, left $4n$ units, up $4n + 1$ units.

_____

Section 2 – Reflection

Mini-Exercise

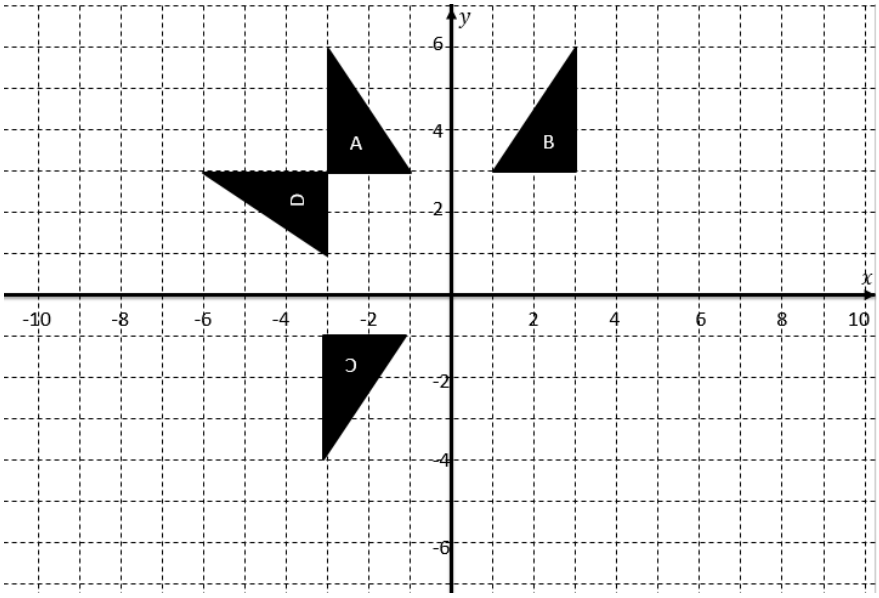
By considering points on each line and observing any pattern, determine the equation the represents the line.



A _____ B _____

C _____ ☠ _____

Test Your Understanding



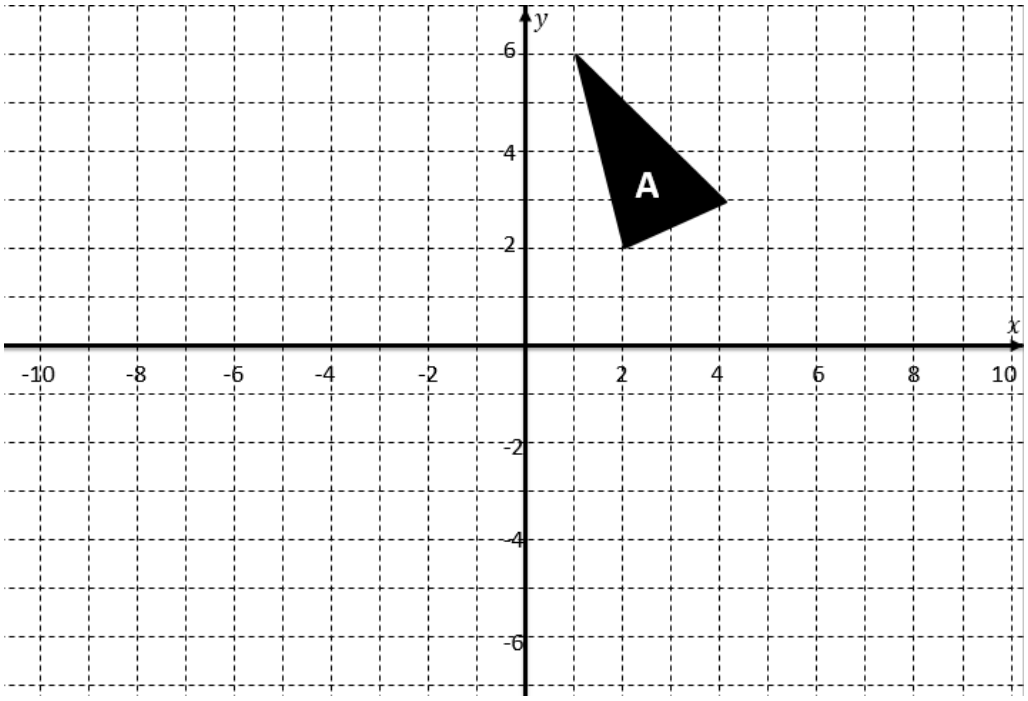
Describe the transformation from:

a) A to B _____

b) A to C _____

c) A to D _____

Test Your Understanding

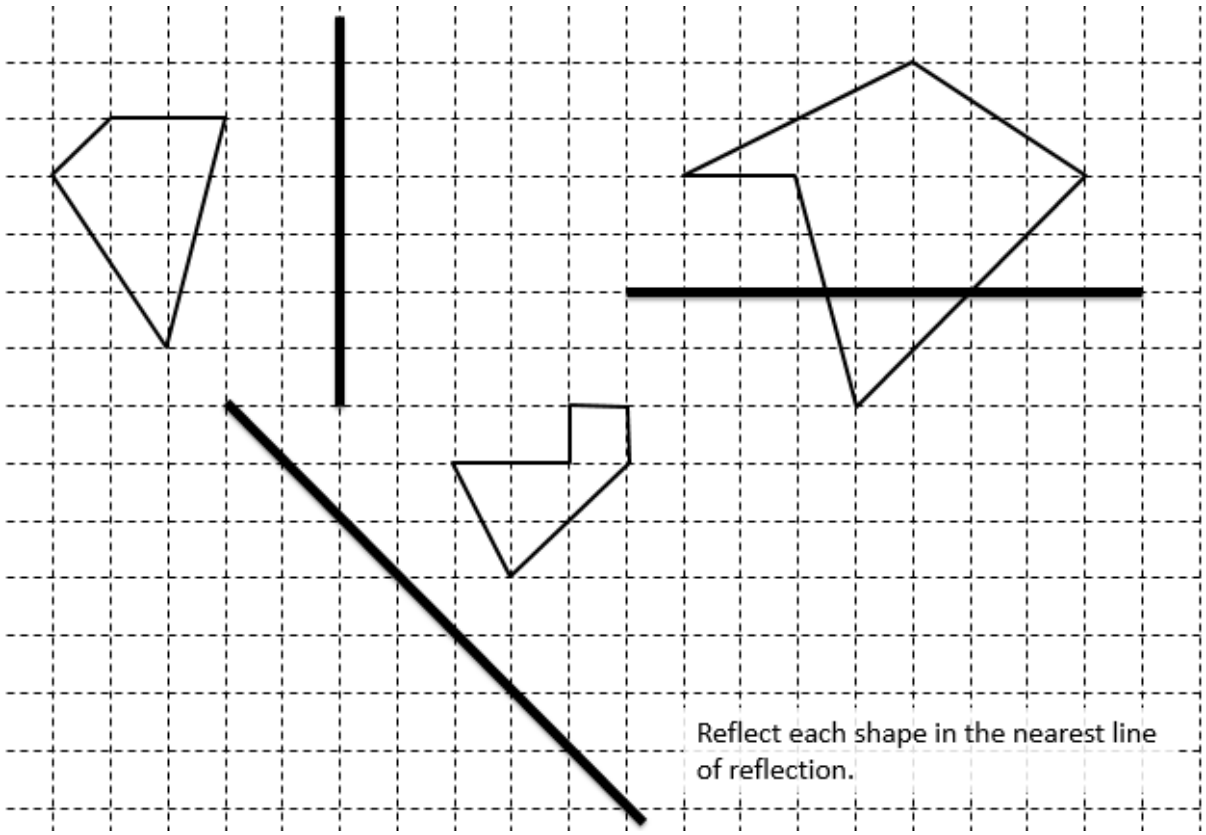


a) Reflect the shape in the line $y = 1$. Label it B.

b) Reflect the shape in the line $y = -x$. Label it C.

Main Exercise

Question 1



Question 2

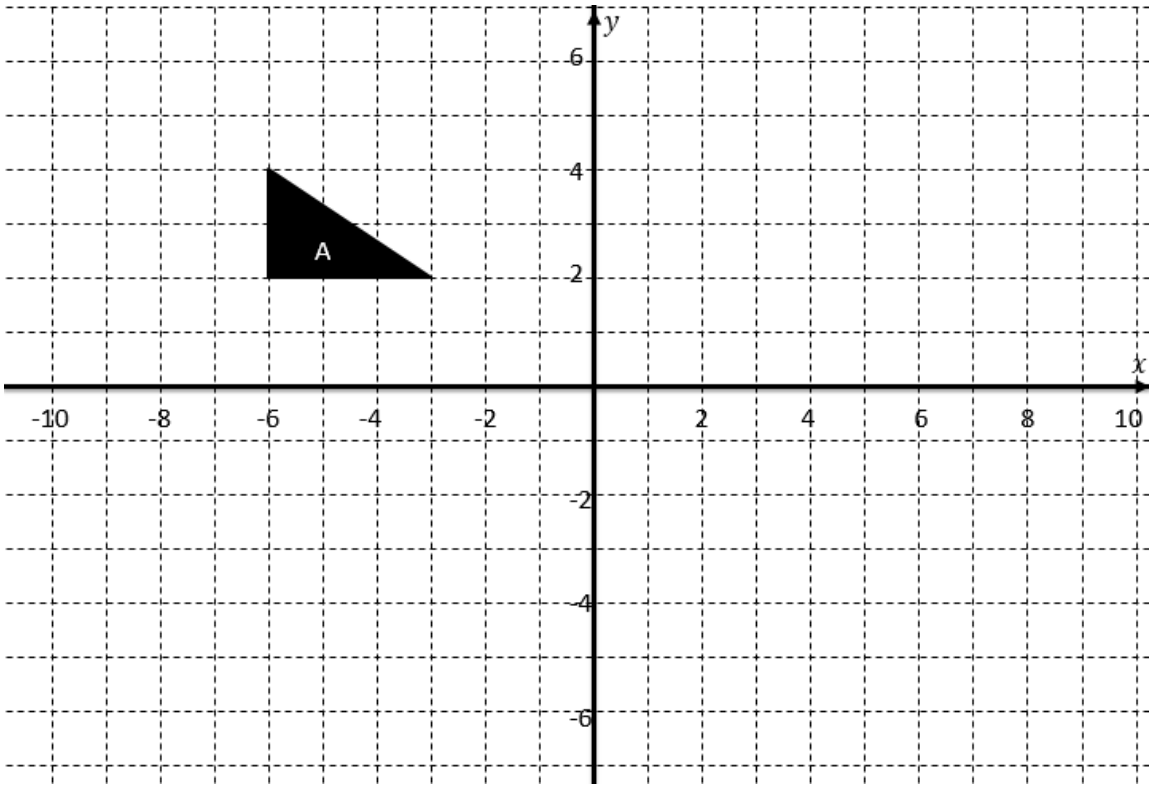
Reflect the shape A in:

a) The y-axis. Label it B.

b) The line $y = 1$. Label it C.

c) The line $y = x$. Label it D.

d) The line $y = -x$. Label it E.



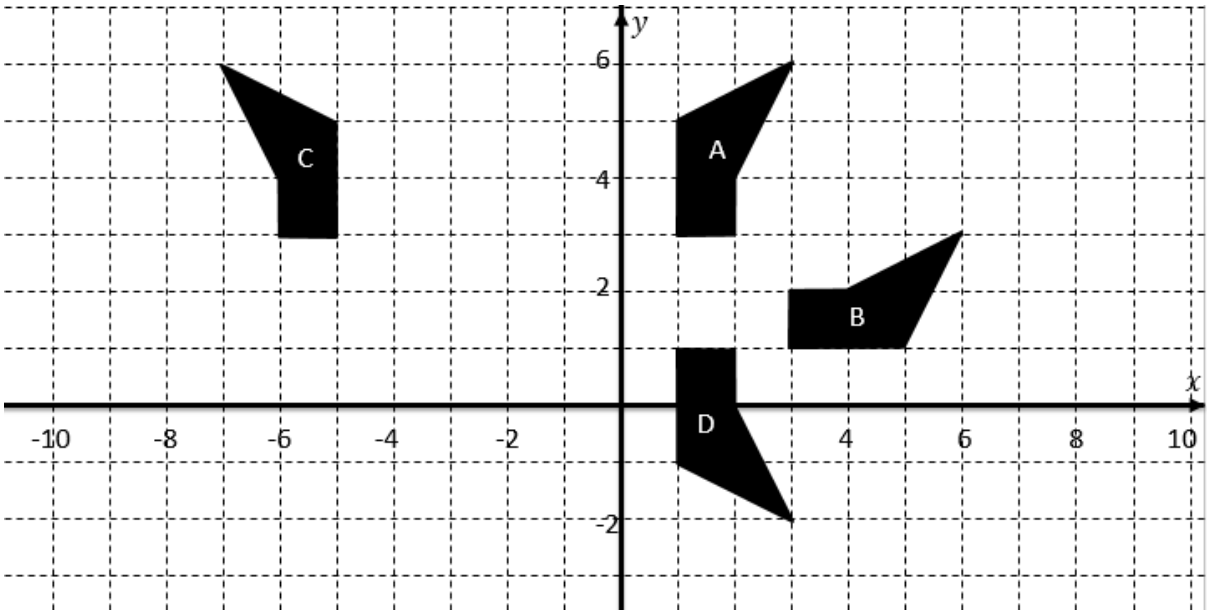
Question 3

Describe the transformation from:

a) A to B: _____

b) A to C: _____

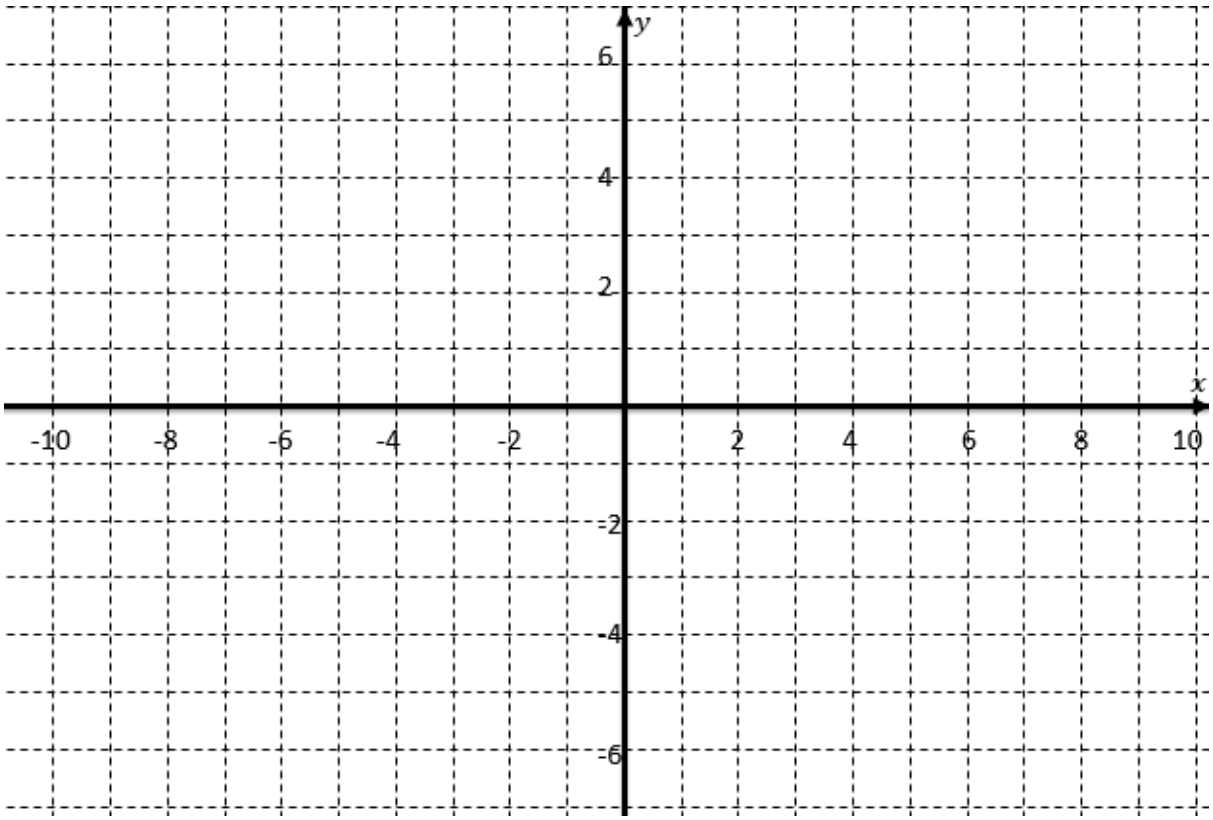
c) A to D: _____



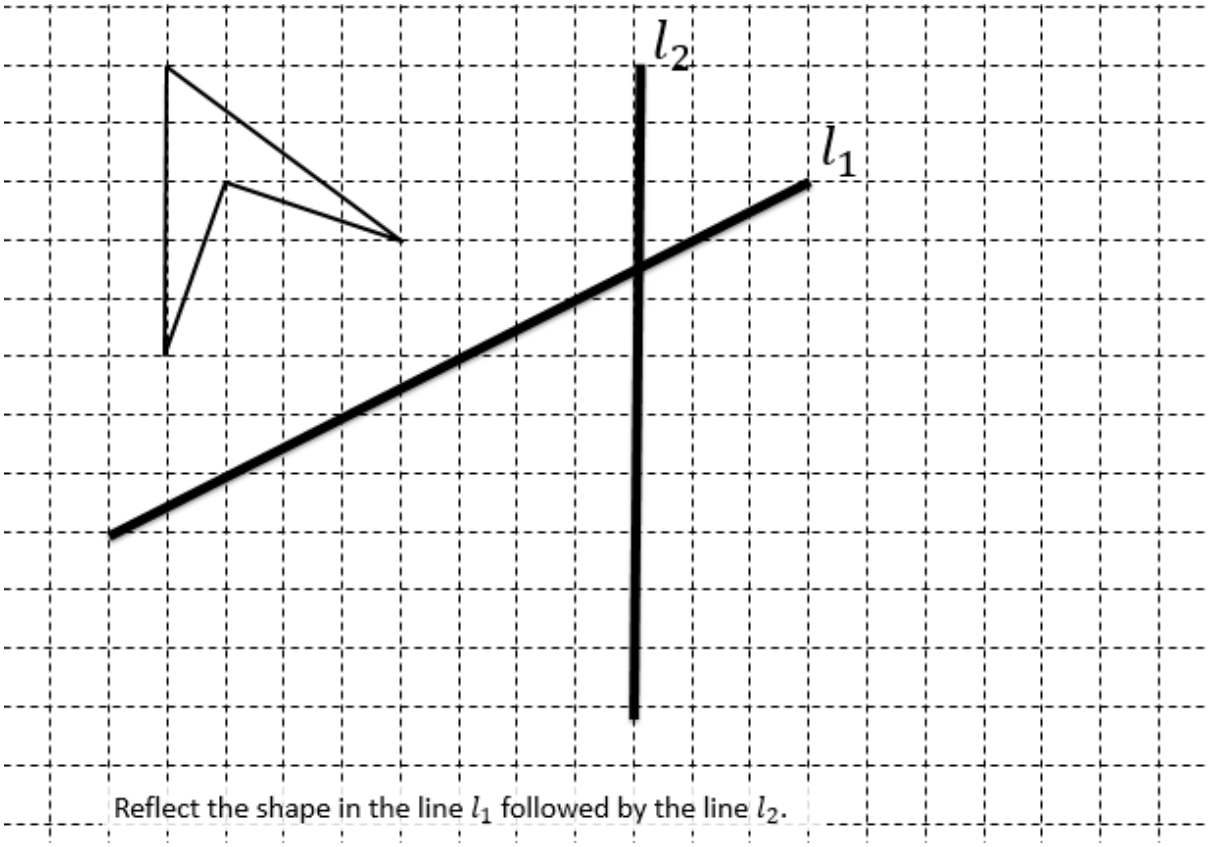
Question 4

a) Plot the points (3,0), (4,0), (7,1), (2,3). Label it Bob.

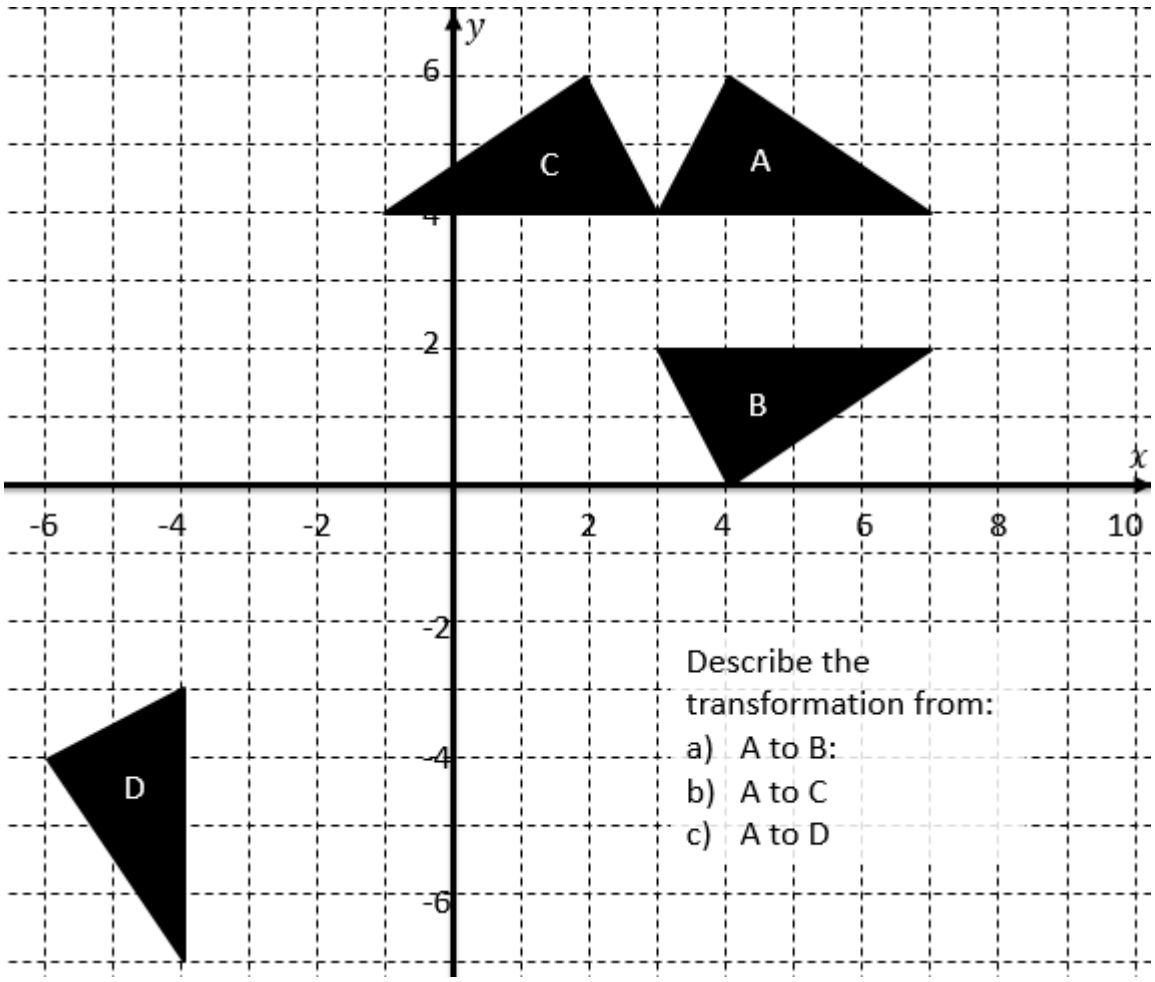
b) Reflect your shape in the line $y = -x$. Label it Steve.



Question 5



Question 6



a) _____

b) _____

c) _____

Question 7

Find the image of each transformation on the point (3, 4) (i.e. give the coordinate of the new point).

a) (3,4) is reflected in the y-axis. (,)
b) (3,4) is reflected in the x-axis. (,)
c) (3,4) is reflected in the line $y = x$. (,)
d) (3,4) is reflected in the line $x = 3$ (,)
e) (3,4) is reflected in the line $y = -1$ (,)

Question ☠

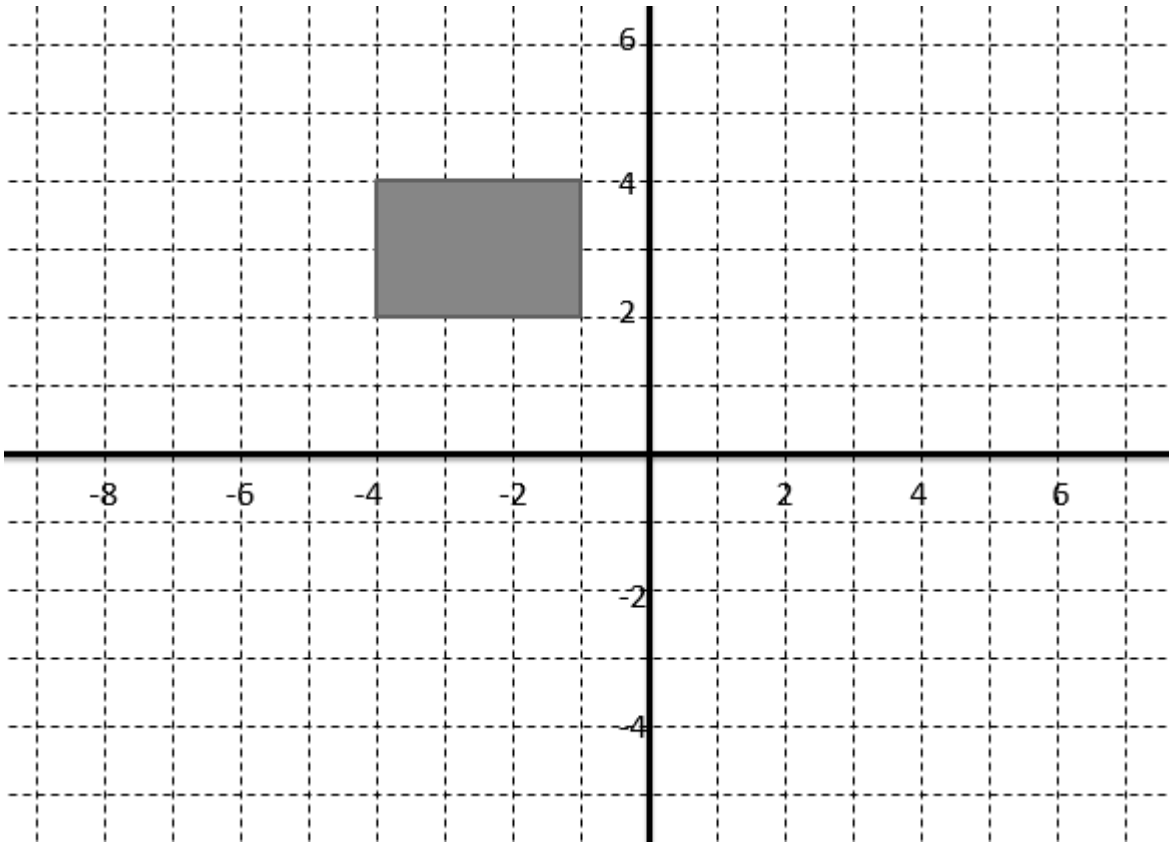
Find the image of each transformation on the point $(3, a)$, giving your coordinates in terms of a and b.

a) $(3, a)$ is reflected in the line $y = a$. (,)
b) $(3, a)$ is reflected in the line $x = a$. (,)
c) $(3, a)$ is reflected in the line $y = -x$. (,)
d) $(3, a)$ is reflected in the line $y = x$ followed by $y = b + 1$. (,)

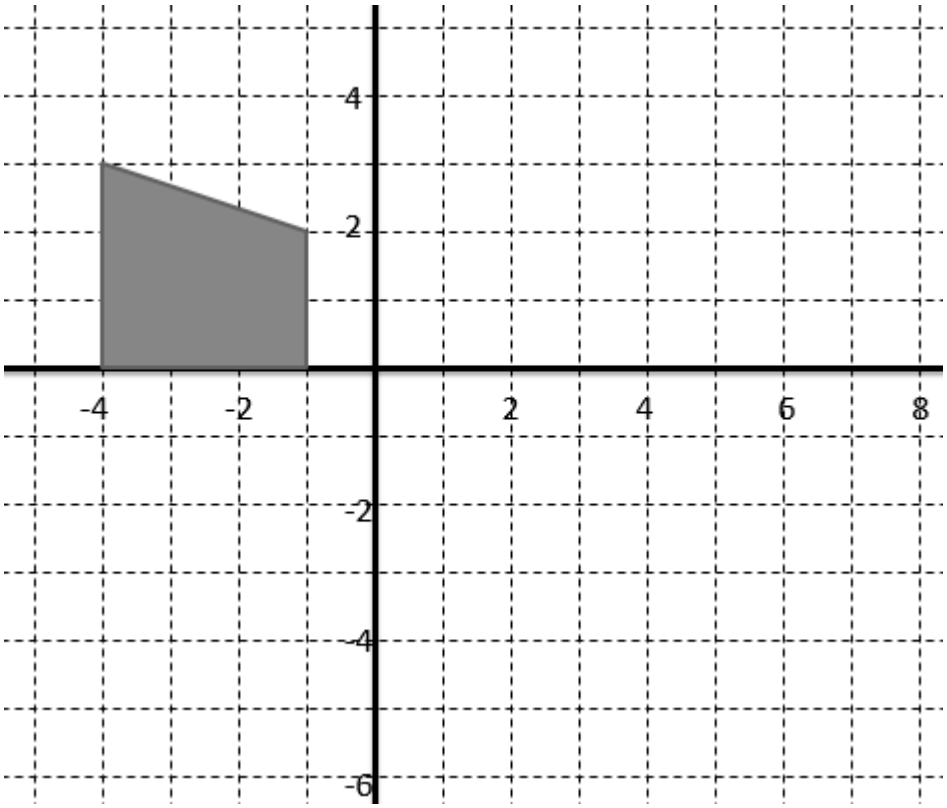
Exercise 3

Test Your Understanding

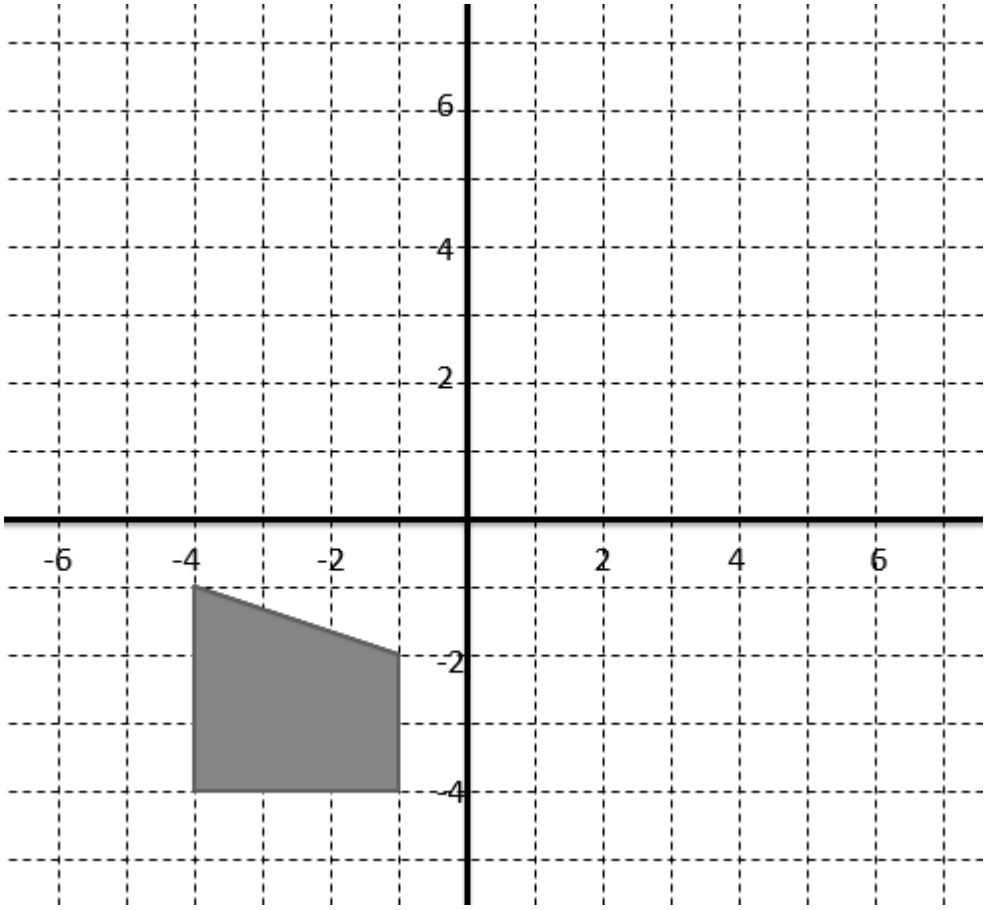
Rotate the object 180° about the point (1,1).



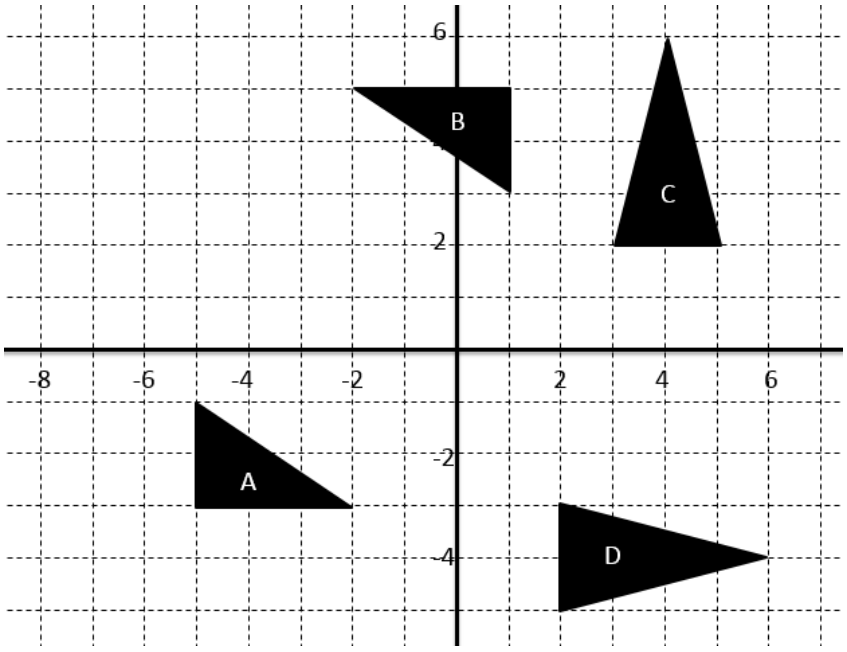
Rotate the object 90° anticlockwise about the point (2,2).



Rotate the object 90° clockwise about the origin.



Test Your Understanding



Describe the following transformations.

A → B

_____

_____

_____

C → D

_____

_____

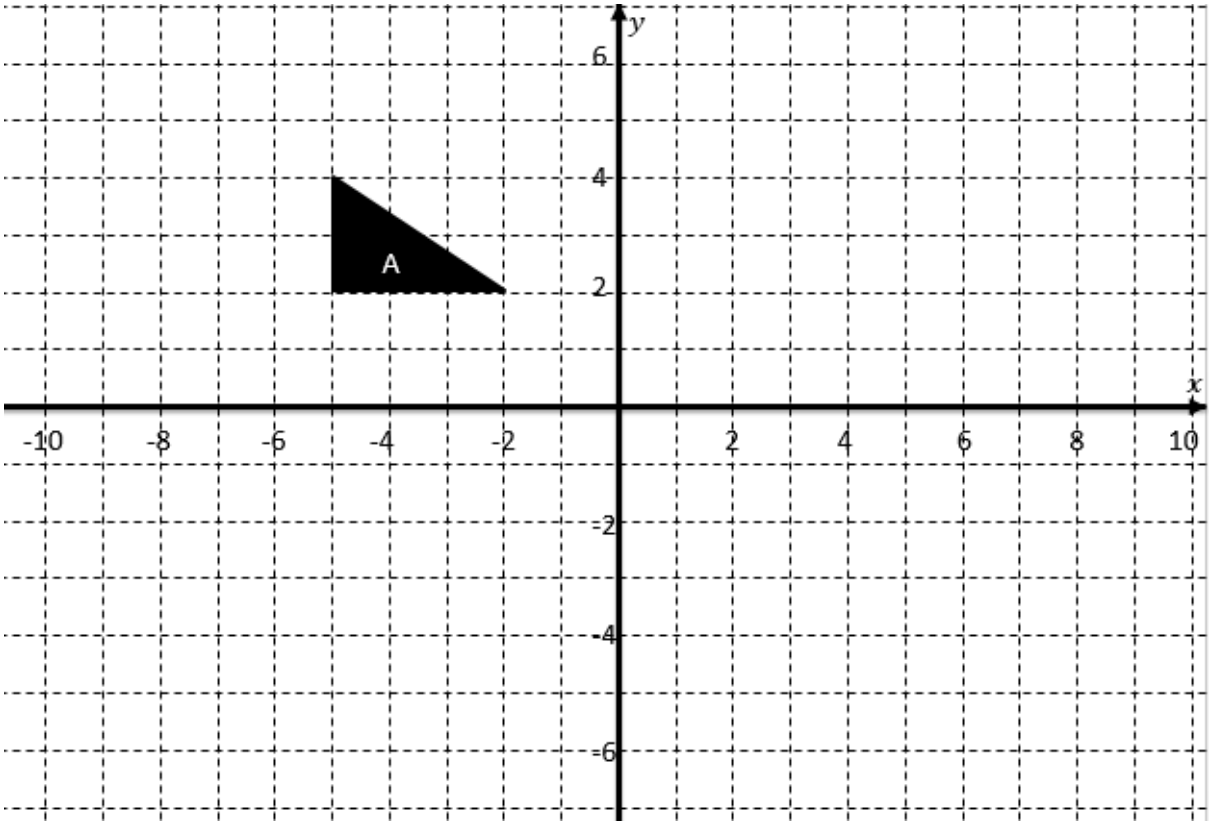
_____

Main Exercises

Question 1

Carry out the following transformations:

a) Rotate the shape A $180°$ about the point $(0,1)$. Label it B.
b) Rotate the shape A $90°$ anticlockwise about the origin. Label it C.

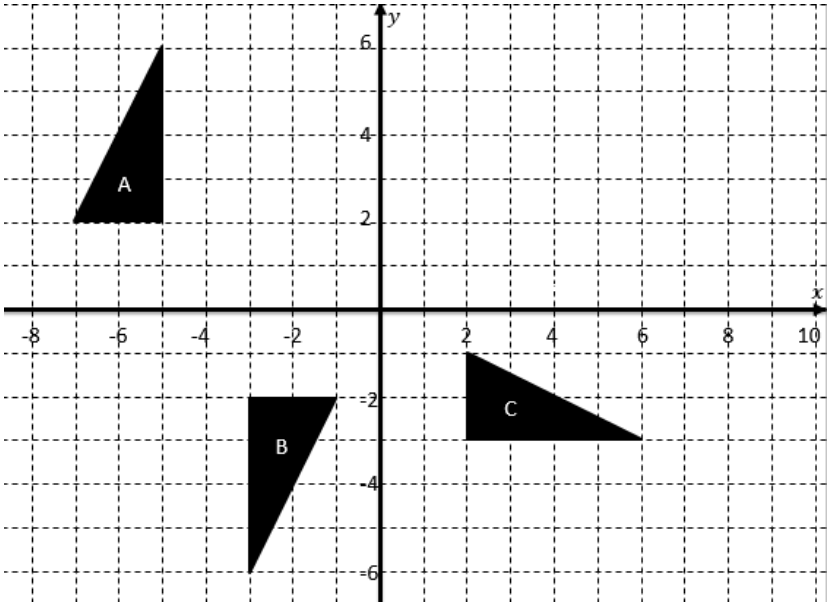


Question 2

Describe the following transformations:

A → B _____

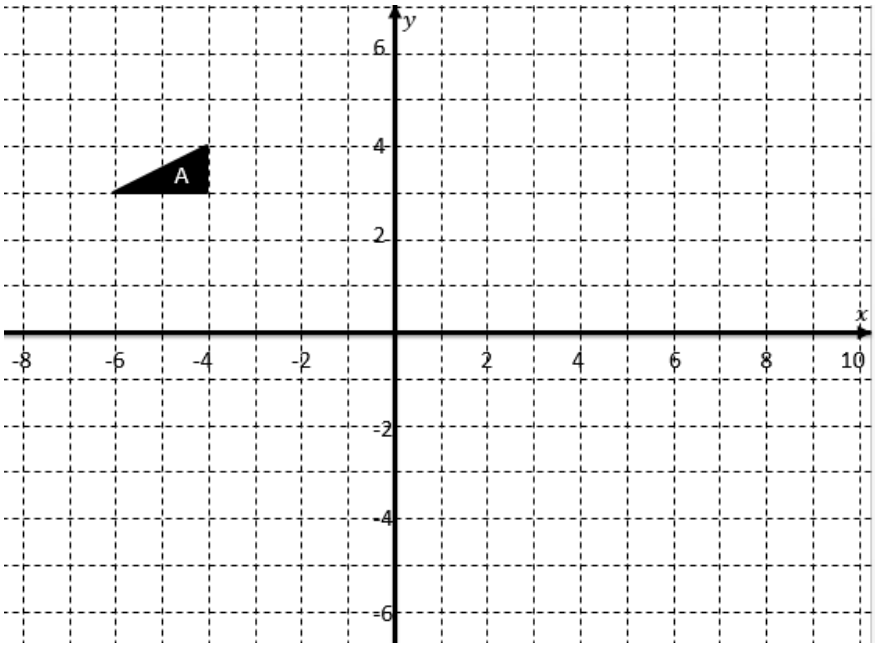
B → C _____



Question 3

Carry out the following transformations:

a) Rotate the shape A $90°$ clockwise about the point $(-3,0)$. Label it B.
b) Rotate the shape A $180°$ about the point $(-1,2)$. Label it C.
c) Rotate the shape A $90°$ anticlockwise about the point $(0,2)$. Label it D.



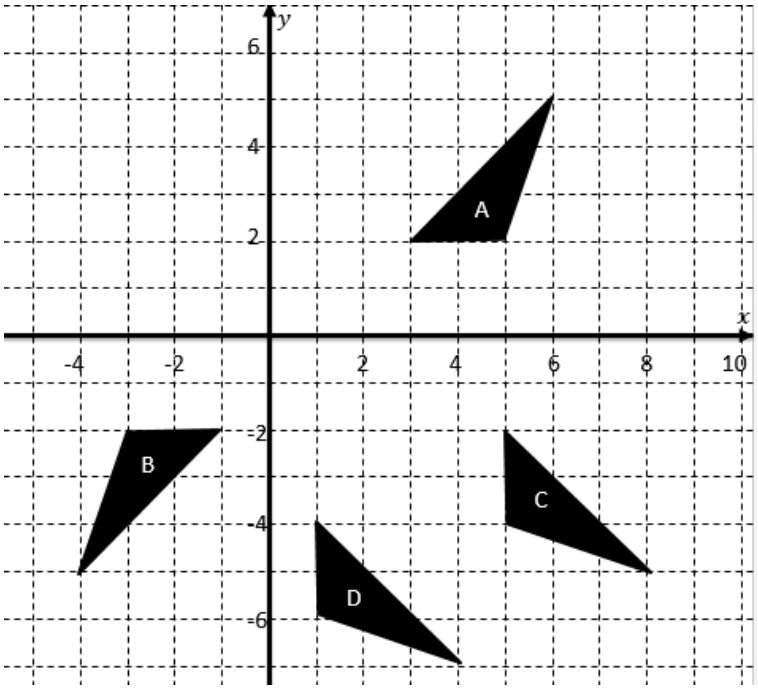
Question 4

Describe the following transformations:

a) A → B _____

b) A → C _____

c) A → D _____



Question 5

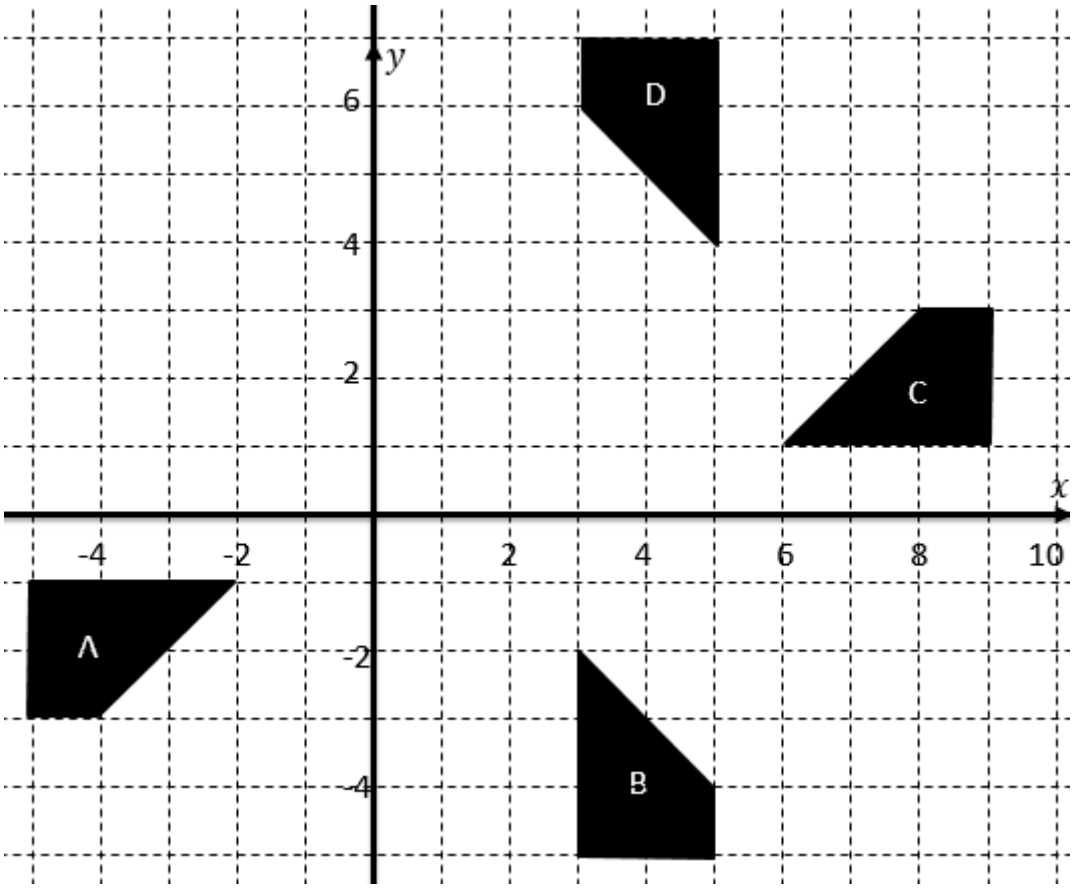
Describe the following transformations:

a) A → B _____

b) B → C _____

c) C → D _____

d) A → C _____



Question 6

Find the effect of the rotation on each of the following points.

a) Rotate $(3,2)$ $180°$ about the origin. _____

b) Rotate $(3,2)$ $90°$ clockwise about the origin. _____

c) Rotate $(3,2)$ $90°$ anticlockwise about the origin. _____

Question ☠

Given that $a > 2$ and $b > 3$, rotate the point (a, b) $90°$ clockwise about the point $(2,3)$. Give your coordinates in terms of a and b.

_____