

## Chapter 8. Reflection

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### Ex 8.1

#### Answer 1.

(i) (3,-9)

The co-ordinate of the given point under reflection in the x-axis is: (3,9).

(ii) (-7, 5)

The co-ordinate of the given point under reflection in the x-axis is: (-7,-5).

(iii) (0, 6)

The co-ordinate of the given point under reflection in the x-axis is: (0,-6).

(iv) (-4,-8)

The co-ordinate of the given point under reflection in the x-axis is: (-4, 8).

#### Answer 2.

(i) (2, 8)

The co-ordinate of the given point under reflection in the y-axis is: (-2,8).

(ii) (-1,-3)

The co-ordinate of the given point under reflection in the y-axis is: (1,-3).

(iii) (5,-6)

The co-ordinate of the given point under reflection in the y-axis is: (-5,-6).

(iv) (-4, 7)

The co-ordinate of the given point under reflection in the y-axis is: (4, 7).

#### Answer 3.

(i) (-1,-4)

The co-ordinate of the given point under reflection in the origin is: (1, 4)

(ii) (2, 7)

The co-ordinate of the given point under reflection in the origin is: (-2,-7)

(iii) (0, 2)

The co-ordinate of the given point under reflection in the origin is: (0,-2)

(iv) (9,-9)

The co-ordinate of the given point under reflection in the origin is: (-9, 9)

#### Answer 4.

$P' = (2, 10)$ . Therefore, the co-ordinates of P under reflection in the x-axis = (2,-10)

#### Answer 5.

$S = (2,-5)$ . Therefore, the co-ordinates of S' under reflection in the origin = (-2, 5)

**Answer 6.**

$$P' = (-3, 4).$$

Therefore, the co-ordinates of P under reflection in the x-axis = (-3,-4)

and the co-ordinates of P'' under reflection in the origin = (3,-4).

The single transformation = reflection in the y-axis.

**Answer 7.**

$$P' = (8,-6).$$

Therefore, the co-ordinates of P under reflection in the x-axis = (8, 6)

and the co-ordinates of P'' under reflection in the y-axis = (-8, 6).

**Answer 8.**

R = (3,-2). Therefore, reflection of R in the origin is R' = (-3, 2)

Q = (-7, 1). Therefore, reflection of Q in the x-axis is Q' = (-7,-1)

$$\begin{aligned} \text{Distance between R' Q'} &= \sqrt{(-7 - (-3))^2 + (-1 - 2)^2} \\ &= \sqrt{(-4)^2 + (-3)^2} \\ &= \sqrt{16 + 9} \\ &= \sqrt{25} \\ &= 5 \text{ units} \end{aligned}$$

**Answer 9.**

B = (3, 2), Therefore, reflection of B in the x-axis is B' = (3,-2)

C = (0, 3), Therefore, reflection of C in the line B is C' = (6, 3).

**Answer 10.**

P'' = (5,-2), therefore, co-ordinates of P' = (-5, 2) and hence the coordinates of P = (-5,-2)

Single transformation = reflection in the y-axis

**Answer 11.**

Let P be the point = (-2, 4).

Image under reflection in the origin P' = (2,-4)

Image under reflection in the y-axis P'' = (2, 4)

$$\begin{aligned} \text{Distance between points of reflection} &= \sqrt{(4 - (-4))^2 + (2 - 2)^2} \\ &= \sqrt{8^2} \\ &= \sqrt{64} \\ &= 8 \text{ units} \end{aligned}$$

**Answer 12.**

$$A = (2, 3); B = (4, -4); C = (6, -7)$$

Co-ordinates of  $\Delta A'B'C'$  under reflection in the line  $y=0$ :

$$A' = (2, -3); B' = (4, 4); C' = (6, 7)$$

Co-ordinates of  $\Delta A''B''C''$  under reflection in the origin:

$$A'' = (-2, 3); B'' = (-4, -4); C'' = (-6, -7)$$

**Answer 13.**

$P = (-8, 1)$ , therefore co-ordinates of  $P'$  under reflection in the x-axis =  $(-8, -1)$ .

Hence, the co-ordinates of  $P''$  under reflection in the origin =  $(8, 1)$ .

The single transformation = reflection in the y-axis.

**Answer 14.**

(i)  $M_x.M_y$  on  $P (2, -5)$

$$M_x.M_y \text{ on } P (2, -5)$$

$$= M_x.M_y (2, -5)$$

$$= M_x (-2, -5)$$

$$= (-2, 5); \text{ reflection in the origin}$$

(ii)  $M_y.M_o$  on  $A (-7, 3)$

$$M_y.M_o \text{ on } A (-7, 3)$$

$$= M_y.M_o (-7, 3)$$

$$= M_y (7, -3)$$

$$= (-7, -3); \text{ reflection in the x-axis}$$

(iii)  $M_o.M_y$  on  $B (4, 6)$

$$M_o.M_y \text{ on } B (4, 6)$$

$$= M_o.M_y (4, 6)$$

$$= M_o (-4, 6)$$

$$= (4, -6); \text{ reflection in the x-axis}$$

(iv)  $M_x.M_o$  on  $P (-1, -3)$

$$M_x.M_o \text{ on } P (-1, -3)$$

$$= M_x.M_o (-1, -3)$$

$$= M_x (-1, 3)$$

$$= (-1, -3); \text{ reflection in the y-axis}$$

**Answer 15.**

(i)  $y = 0$

Co-ordinates of image =  $(-5, 2 \times 0 - 4) = (-5, -4)$

(ii)  $y = 4$

Co-ordinates of image =  $(-5, 2 \times 4 - 4) = (-5, 4)$

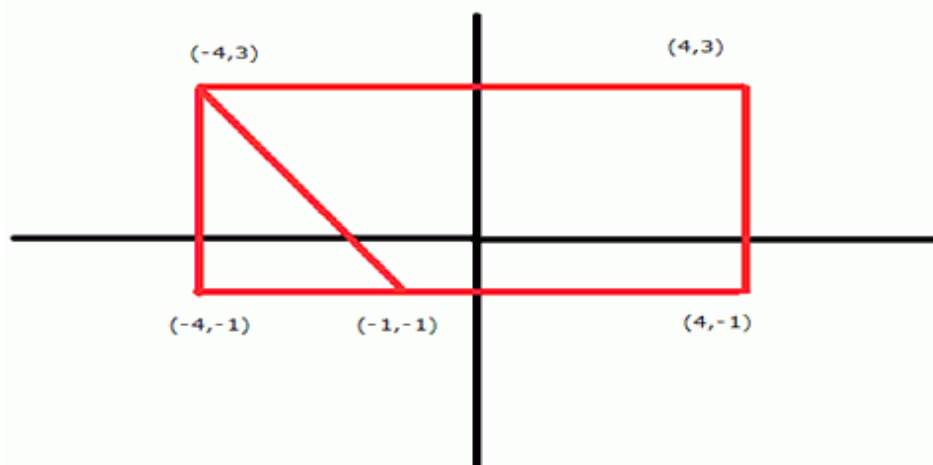
**Answer 16.**

(i)  $x = 0$

Co-ordinates of image =  $(2 \times 0 - 4, -1) = (-4, -1)$

(ii)  $y = 5$

Co-ordinates of image =  $(4, 2 \times 5 - (-1)) = (4, 11)$

**Answer 17.**(i) Find the co-ordinates of  $P'Q'R'$ ,  $Q'$  and  $R'$ The co-ordinates are:  $P'Q'R' = (-1, -1)$ ;  $Q' = (-4, -1)$ ;  $R' = (-4, 3)$ (ii) What kind of figure is formed by  $RR' Q' Q$ ?A rectangle is formed by  $RR' Q' Q$ .(iii) Find the perimeter of the figure  $P'Q'R'$ 

The figure is a right angled triangle with sides 4 units, 3 units and 5 units.

Here, height = 4 units, base = 3 units and

Hypotenuse =

$$= \sqrt{4^2 + 3^2}$$

$$= \sqrt{16 + 9}$$

$$= \sqrt{25}$$

$$= 5 \text{ units}$$

Perimeter = height + base + hypotenuse

$$= 4 + 3 + 5$$

$$= 12 \text{ units}$$

**Answer 18.**

A (1,-5), the co-ordinates of A' = (1, 2x1-(-5)) = (1, 7)

B (-5, 1), the co-ordinates of B' = (-5, 2x4-(1)) = (-5, 7)

The distance AB' =

$$\begin{aligned} &= \sqrt{(-5-1)^2 + (7-(-5))^2} \\ &= \sqrt{(-6)^2 + 12^2} \\ &= \sqrt{36 + 144} \\ &= \sqrt{180} \\ &= 13.41 \text{ units} \end{aligned}$$

**Answer 19.**

A (4,-1), the co-ordinates of A' = (2x1-4,-1) = (-2,-1)

A' (6,-1), the co-ordinates of B = (6, 2x3-(-1)) = (6, 7)

The distance between A' B' =

$$\begin{aligned} &= \sqrt{(6-(-2))^2 + (-1-(-1))^2} \\ &= \sqrt{8^2 + 0} \\ &= 8 \text{ units} \end{aligned}$$

Distance till midpoint = 4 units

Co-ordinates of mid-point = (-2+4, -1+4) = (2, 3)