

Chapter 8. Reflection

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 $Q' = (-7, -1)$

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

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.

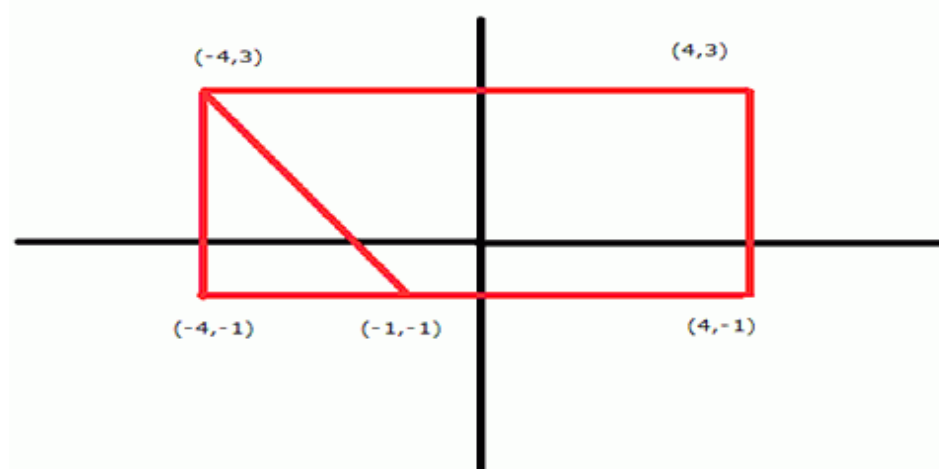
(i) Find the co-ordinates of $P'Q'R'$, Q' and R'

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)