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)

Distance between R' Q' = $\sqrt{(-7-(-3))^2+(-1-2)^2}$

$= \sqrt{(-4)^2+(-3)^2}$

$= \sqrt{16+9}$

$= \sqrt{25}$

$= 5\,\text{units}$

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)

Distance between points of reflection = $\sqrt{(4-(-4))^2+(2-2)^2}$

$= \sqrt{8^2}$

$= \sqrt{64}$

$= 8\,\text{units}$

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 on P (2,-5)

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

= M_x (-2,-5)

= (-2, 5); reflection in the origin

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

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

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

= M_y (7,-3)

= (-7,-3); reflection in the x-axis

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

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

=$M_o.M_y$ (4, 6)

= M_o (-4, 6)

= (4,-6); reflection in the x-axis

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

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

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

= M_x (-1, 3)

= (-1,-3); reflection in the y-axis

Answer 15.

(i) y = 0
Co-ordinates of image = (-5, 2x0-4)= (-5,-4)
(ii) y = 4
Co-ordinates of image = (-5, 2x4-4)= (-5,4)

Answer 16.

(i) x = 0
Co-ordinates of image =(2x0-4,-1)= (-4,-1)
(ii) y = 5
Co-ordinates of image = (4, 2x5-(-1)) = (4, 11)

Answer 17.

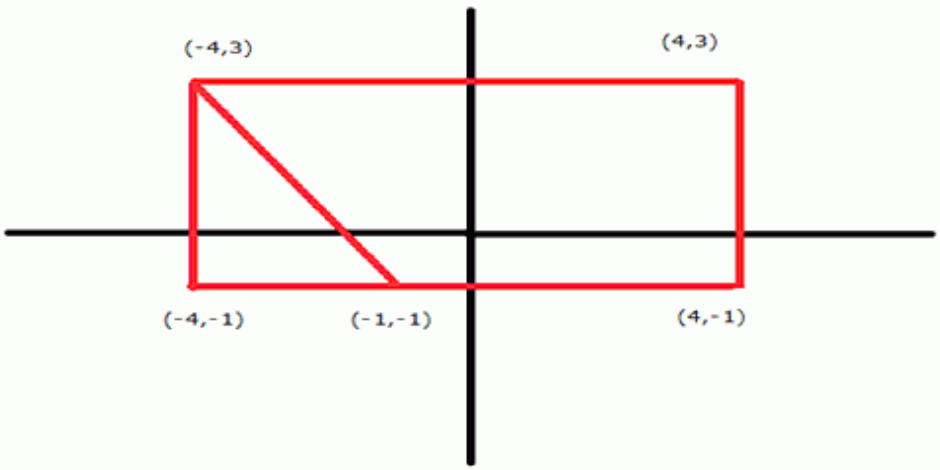
(i) Find the co-ordinates of P'Q'R', Q' and R'

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 =

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

$= \sqrt{16 + 9}$

$= \sqrt{25}$

= 5units

Perimeter = height + base + hypotenuse

= 4 + 3 + 5

= 12 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′ =

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

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′ =

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

Distance till midpoint = 4 units

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