Image of a Point in Different Cases

(1) The image of a point with respect to the line mirror The image of

$$A(x_1, y_1)$$
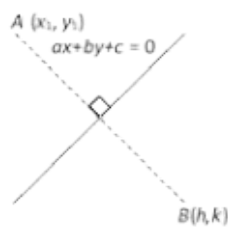
with respect to the line mirror

$$ax + by + c = 0$$

be

$$B(h, k)$$

is given by,

$$\frac{h - x_1}{a} = \frac{k - y_1}{b} = \frac{-2(ax_1 + by_1 + c)}{a^2 + b^2}$$

(2) The image of a point with respect to *x*-axis : Let

$$P(x, y)$$

be any point and

$$P'(x', y')$$

its image after reflection in the *x*-axis, then

$$x' = x$$

$$y' = -y,$$

(

$$\because$$

$$O'$$

is the mid point of *P* and

$$P'$$

)

(3) **The image of a point with respect to y-axis :** Let

$$P(x,y)$$

be any point and

$$P'(x',y')$$

its image after reflection in the *y-axis,* then
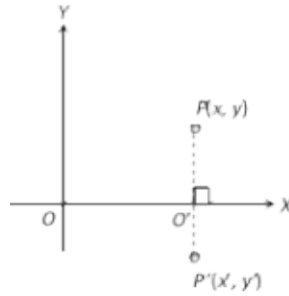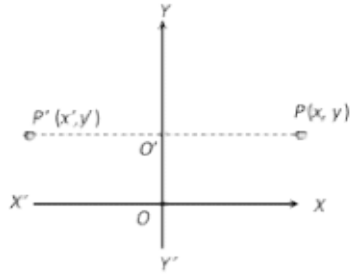
$$x'=-x$$

$$y'=y$$

,   (

$$\because$$

$$O'$$

is the mid point of *P* and

$$P'$$

)

(4) **The image of a point with respect to the origin :** Let

$$P(x,y)$$

be any point and

$$P'(x',y')$$

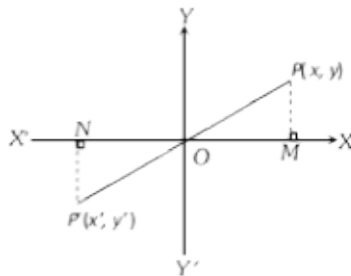be its image after reflection through the origin, then

$$x'=-x$$

$$y'=-y$$

,(

$$\therefore$$

$$O$$

is the mid point of P,

$$P'$$

).

(5) **The image of a point with respect to the line**

$$y=x$$

: Let

$$P(x,y)$$

be any point and

$$P'(x',y')$$

be its image after reflection in the line

$$y=x$$

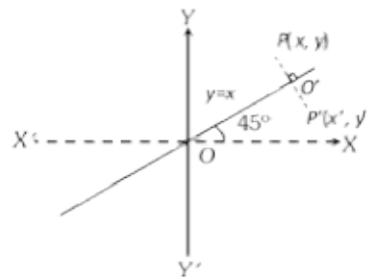, then

$$x'=y$$

$$y'=x$$

, (

$$\because$$

$$O'$$

is the mid point of P and

$$P'$$

).

(6) **The image of a point with respect to the line**

$$y=x\tan\theta$$

: Let

$$P(x,y)$$

be any point and

$$P'(x',y')$$

be its image after reflection in the line

$$y=x\tan\theta$$

, then

$x'=x\cos2\theta+y\sin2\theta$

$y'=x\sin2\theta-y\cos2\theta$

, (

$\because$

O'

is the mid point of P and

P'

)