Class:First Stage
Subject:Mathmatics
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TUTORIAL

Example:

Write the equation of a line that passes through the point p (3, 1) and is (parallel, perpendicular) to the line L: y= 2x+3, and the distance from P to L.

Solution

1- **Parallel lines** have the same slope.

The slope of the line with equation

$$y: 2x + 3 \text{ is}$$

$$m=2$$

$$L \,//\, L'$$

$$m=m'=2$$

Now use the point-slope form to find the equation.

$$y-y' = m'(x-x')$$

We have to find the equation of the line which has Slope 2 and passes through the point (3,1).

$$y-1=2(x-3)$$

$$y-2x=-5$$

2- Perpendicular lines

$$m \cdot m' = -1$$

$$m' = \frac{-1}{2}$$

$$y-y' = m'(x-x')$$

$$y-1=\frac{-1}{2}(x-3)$$

$$y=\frac{-1}{2}x+\frac{3}{2}+1$$

$$y=\frac{-1}{2}x+\frac{5}{2}$$

3- distance from p to L

1) Find equation of perpendicular line

$$y=\frac{-1}{2}x+\frac{5}{2}$$

2) Find the point Q(x2 , y2)

$$y=2x+3\ldots\ldots\ldots\ldots\ldots..(1)$$

$$y=\frac{-1}{2}x+\frac{5}{2}\ldots\ldots\ldots\ldots(2)$$

Eq.(1) in (2)

$$2x+3=\frac{-1}{2}x+\frac{5}{2}$$

$$2x+\frac{1}{2}x=\frac{5}{2}-3$$

$$\frac{5}{2}x=\frac{-1}{2}$$

X= $-\frac{1}{5}$

$$y = 2 * \frac{-1}{5} + 3 = \frac{13}{5}$$

Q (-1/5, 13/5)

$$d = \sqrt{(x_Q - x_p)^2 + (y_Q - y_p)^2}$$

$$d = \sqrt{(\frac{-1}{5} - 3)^2 + (\frac{13}{5} - 1)^2}$$

$$d = \sqrt{(\frac{-16}{5})^2 + (\frac{8}{5})^2} = 3.57$$