Example

A line is perpendicular to the line $x=-3$ and passes through the point $(2,-5)$. Find the equation of this line.

Since $x=-3$ is an equation of a vertical line. Then our line must be horizontal and its equation must pass through the point $(2,-5)$.

$\Rightarrow y=-5$ is our equation

$\#$

The slope-intercept form of a line is $y=mx+b$

We have another form to express the equation of a line with slope $m$ and passing through the point $P(x_1,y_1)$.
The equation would be:

$$y-y_1=m(x-x_1)$$

Example

Let $L_1$ be the line with equation $2x-y=5$.
Let $L_2$ " " " passing through $(1,1)$
$L_1$ and $L_2$ are perpendicular. Write an equation of line $L_2$.

$$2x-y=5 \Rightarrow -y=-2x+5.$$
$$L_1: y=2x-5.$$

A perpendicular line to $L_1$ would have slope $m=-\frac{1}{2}$.

The point-slope form of the line is: $y-y_1=m(x-x_1)$.
The point is $(1,1)$ $\Rightarrow$ $y-1=-\frac{1}{2}(x-1)$

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

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