

## Formulas Associated with Lines

### Slope Formula:

Let two points of a line be  $P(x_1, y_1)$  and  $Q(x_2, y_2)$ . Then, the slope  $m$  of the line is found by the formula below.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

### Equation of a Line in Point-Slope Form:

Let  $m$  be the slope of a line containing the point  $P(x_1, y_1)$ . Then, the point-slope form of the equation of the line is

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

### Equation of a Non-Vertical Line in Slope-Intercept Form:

Let  $m$  be the slope of a non-vertical line and the point  $(0, b)$  be the  $y$ -intercept. Then, the slope-intercept form of the equation of the line is  $y = mx + b$ .

### Equation of a Line in General Form:

Every line can be expressed in the form  $Ax + By + C = 0$  where  $A$ ,  $B$ , and  $C$  are integers,  $A$  and  $B$  are not both zero, and  $A > 0$ .

### Equation of a Line in Standard Form:

Every line can be expressed in the form  $Ax + By = C$  where  $A$ ,  $B$ , and  $C$  are integers,  $A$  and  $B$  are not both zero, and  $A > 0$ .

### Equations of a Horizontal and a Vertical Line:

If  $(x_1, y_1)$  is a point on a horizontal or vertical line, then the equation of the horizontal line is  $y = y_1$  and the equation of the vertical line is  $x = x_1$ .