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ANALYTIC GEOMETRY

Length $\overline{P_1P_2}$ of a directed line segment with initial point P_1 and terminal point P_2 .

$$d = |\overline{P_1P_2}| = |x_2 - x_1|$$

Distance (d) between two given points $P_1(x_1, y_1)$ and $P_2(x_2, y_2)$.

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

Coordinates of the point P(x,y) which divides the directed line segment $\overline{P_1P_2}$, given the points $P_1(x_1, y_1)$ and $P_2(x_2, y_2)$, and rati r=$\overline{P_1P} : \overline{PP_2}$

$$x = \frac{x_1 + rx_2}{1 + r} \qquad r \neq -1$$

$$y = \frac{y_1 + ry_2}{1 + r} \qquad r \neq -1$$

Coordinates of the midpoint Pm(x,y) of the directed line segment $\overline{P_1P_2}$, with given end points $P_1(x_1, y_1)$ y $P_2(x_2, y_2)$.

$$x = \frac{x_1 + x_2}{2}$$

$$y = \frac{y_1 + y_2}{2}$$

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ANALYTIC GEOMETRY

The slope or angular coefficient (m) of a line is the tangent of its angle of inclination (α).

$$m = tan(\alpha)$$

Slope (m) of the straight line passing through two given points $P_1(x_1, y_1)$ y $P_2(x_2, y_2)$.

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

Angle (θ) formed by two straight lines with initial slope m_1 and terminal slope m_2.

$$tan(\theta_1) = \frac{m_2 - m_1}{1 + m_2 m_1} \; ; \; m_2 m_1 \neq -1$$

Necessary and sufficient condition for the parallelism of two given straight lines having slopes m_1 and m_2.

$$m_1 = m_2$$

Necessary and sufficient condition for the perpendicularity of two given straight lines having slopes m_1 and m_2.

$$m_1 m_2 = -1$$

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ANALYTIC GEOMETRY

Point-Slope Form of Equation of a Straight Line

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

Slope-Intercept Form of the Equation of a Straight Line

$$y = mx + b$$

Intercept Form of the Equation of a Straight Line

$$\frac{x}{a} + \frac{y}{b} = 1 \; ; a \wedge b \neq 0$$

General Form of the Equation of a Straight Line

$$Ax + By + C = 0$$

Slope: $m = -\frac{A}{B}$

Intercept: $b = -\frac{C}{B}$