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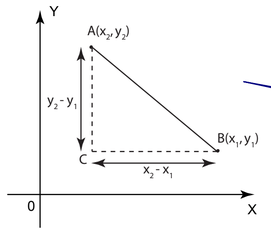
Coordinate Geometry

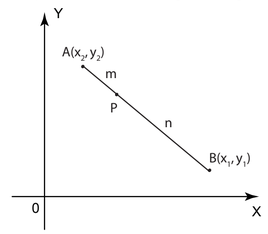
Distance Between 2 Points



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

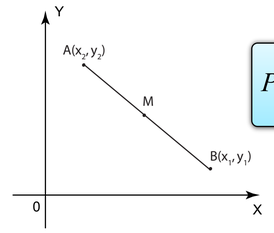
Devision of a Line Segment

A point dividing a segment of a line



$$P=\left(\frac{nx_1+mx_2}{m+n},\frac{ny_1+my_2}{m+n}\right)$$

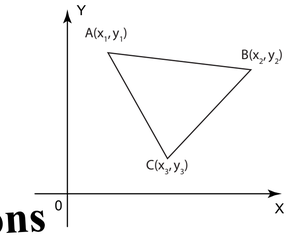
Midpoint



$$M=\left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right)$$

Area of Polygons

$$A=\frac{1}{2}\left|\left(x_1y_2+x_2y_3+x_3y_1\right)-\left(x_2y_1+x_3y_2+x_1y_3\right)\right|$$



Straight Lines

Gradient

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

$$m=-\left(\frac{y-\text{int}\,ercept}{x-\text{int}\,ercept}\right)$$

Equations

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

Find from

1 Given point + Gradient

$$\frac{y-y_1}{x-x_1}=\frac{y_2-y_1}{x_2-x_1}$$

2 Given Points

x and y - Intercept

$$\frac{x}{a}+\frac{y}{b}=1$$

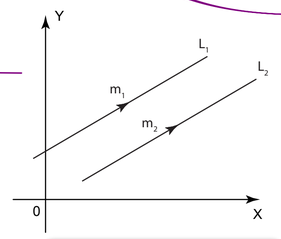
Form

Gradient $y=mx+c$

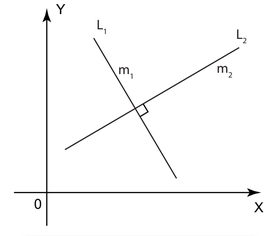
General $ax+by+c=0$

Intercept $\frac{x}{a}+\frac{y}{b}=1$ $m=-\frac{b}{a}$

Parallel



Perpendicular



$m_1 = m_2$

m_1 = gradient of line 1
m_2 = gradient of line 2

$m_1 \times m_2 = -1$

m_1 = gradient of line 1
m_2 = gradient of line 2

Locus

Distance between 2 Points

(use the formula of distance)
The equation of the locus of a moving point which is always at a constant distance (r) from a fixed point A is

$$PA=r$$
$$(x-x_1)^2+(y-y_1)^2=r^2$$

The equation of the locus of a moving point which is always equidistant from two fixed points A and B is the perpendicular bisector of the straight line AB.

$$PA=PB$$
$$(x-x_1)^2+(y-y_1)^2=(x-x_2)^2+(y-y_2)^2$$

The equation of the locus of a moving point which is always at a constant distance from two fixed points A and B with a ratio is

$$\frac{PA}{PB}=\frac{m}{n}$$
$$\frac{(x-x_1)^2+(y-y_1)^2}{(x-x_2)^2+(y-y_2)^2}=\frac{m^2}{n^2}$$