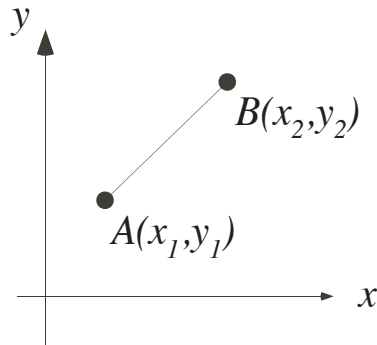




Intermediate Math Circles

Summary of Analytic Geometry I

From February 20, 2013



If d is the distance between two points $A(x_1, y_1)$ and $B(x_2, y_2)$ then

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

If $M(x_m, y_m)$ is the midpoint of AB then

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

If m is the slope of a line segment containing two points $A(x_1, y_1)$ and $B(x_2, y_2)$, then

$$m = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

Special Cases for Slopes

- (i) Slope of Horizontal Lines: $m = 0$
- (ii) Slope of Vertical Lines: m is undefined
- (iii) Slope of Parallel Lines: $m_1 = m_2$
- (iv) Slope of Perpendicular Lines: $m_1 = \frac{-1}{m_2}$ or $m_1 \times m_2 = -1$

