

Absolute Value Defn: The absolute value of a real # z is

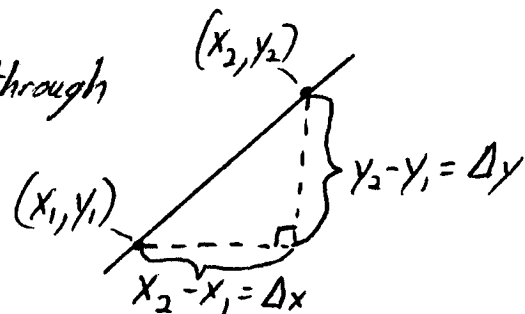
$$|z| = \begin{cases} z & \text{if } z \geq 0 \\ -z & \text{if } z < 0 \end{cases}$$

Rule: $\sqrt{z^2} = |z|$

Lines

Defn The slope of the line passing through points (x_1, y_1) & (x_2, y_2) is

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

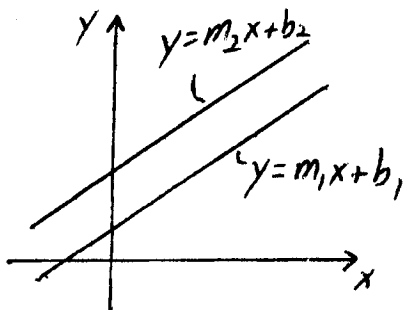


Slope-Intercept Form: $y = mx + b$ is line with slope m & y -intercept b .

Point-Slope Form $y - y_1 = m(x - x_1)$ is line with slope m & passing through point (x_1, y_1)

Parallel Lines

Same slopes
 $m_1 = m_2$



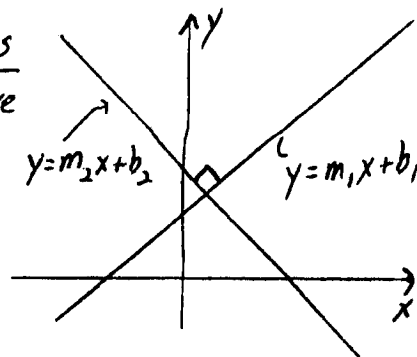
Perpendicular Lines

Slopes are negative reciprocals

$$m_1 m_2 = -1$$

or

$$m_1 = -\frac{1}{m_2}$$



Some Basic Facts about Numbers

Let A and B be numbers

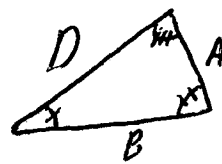
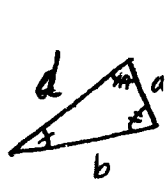
1) If $A \cdot B = 0 \Rightarrow A = 0$ or $B = 0$

2) If $\frac{A}{B} = 0 \Rightarrow A = 0$ and $B \neq 0$

Triangles

Similar Triangles

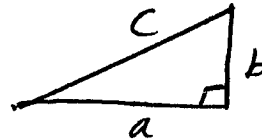
All angles match



$$\Rightarrow \begin{cases} \frac{B}{D} = \frac{b}{d} \\ \frac{A}{B} = \frac{a}{b} \\ \frac{A}{D} = \frac{a}{d} \end{cases}$$

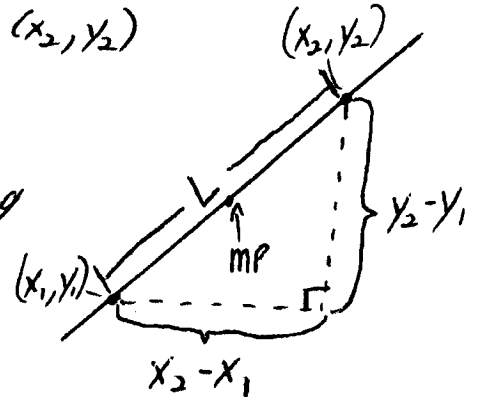
Pythagorean Theorem

$a^2 + b^2 = c^2$ if & only if the triangle is right



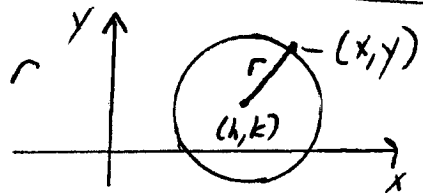
Defn The distance between two points (x_1, y_1) & (x_2, y_2) in the xy -plane $L = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Defn The midpoint of the line segment joining points (x_1, y_1) & (x_2, y_2) is $MP = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$



Circles

Defn The circle w/ center (h, k) & radius r is given by $(x - h)^2 + (y - k)^2 = r^2$



Note: This equation follows immediately from the distance formula since $r = \sqrt{(x - h)^2 + (y - k)^2}$