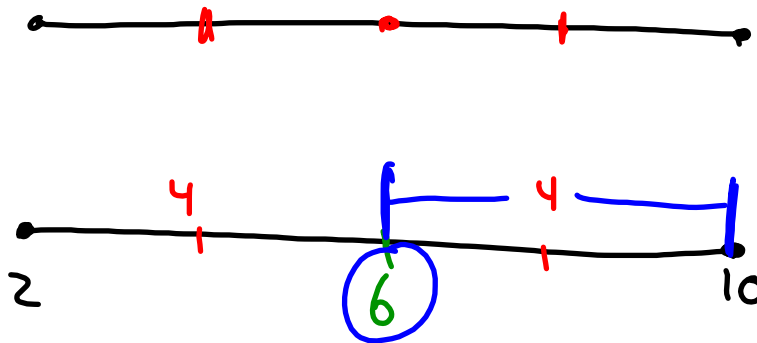
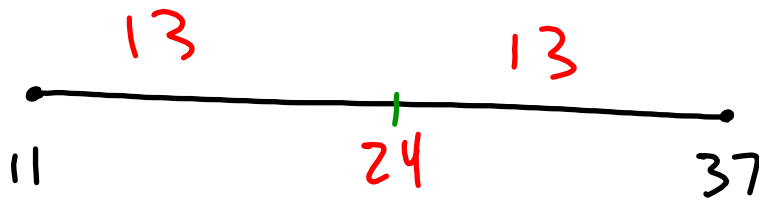


$$\frac{10+2}{2} = 6$$



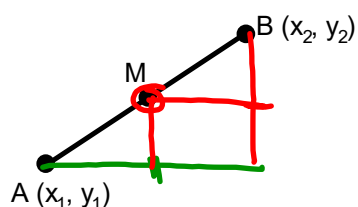
$$10 - 2 = 8$$

$$\frac{8}{2} = 4$$



$$\frac{11+37}{2} = \frac{48}{2} = 24$$

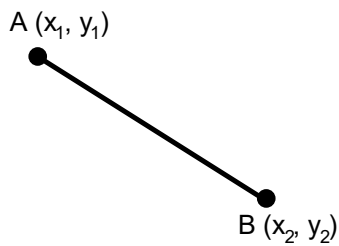
Midpoint of a line segment



Midpoint

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

Slope

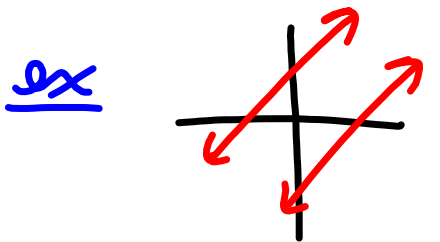


$$m = \frac{\text{rise}}{\text{run}}$$

$$\frac{3}{7} \quad \frac{-3}{-7}$$

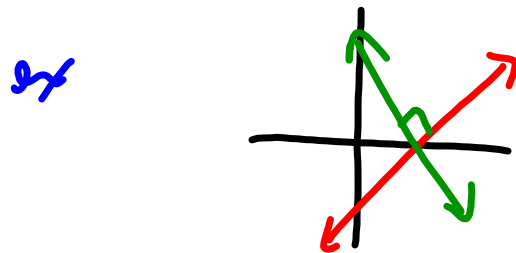
$$= \frac{y_1 - y_2}{x_1 - x_2}$$

Parallel Lines



same slope.

Perpendicular Lines



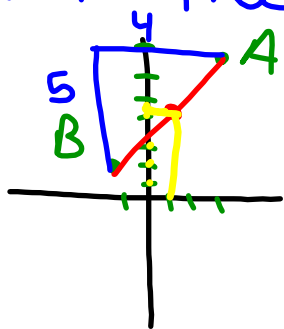
- slopes are
negative reciprocal

ex

$$\frac{2}{3} \rightarrow \frac{-3}{2}$$

$$-6 \rightarrow \frac{1}{6}$$

Determine the slope between the points $A(3, 7)$ and $B(-1, 2)$ and the midpoint of AB .



$$m = \frac{5}{4}$$

$$m = \frac{7-2}{3-(-1)} \quad \left| \quad \begin{array}{l} 2-7 \\ -1-3 \\ = -5 \\ = -4 \end{array} \right.$$

Midpoint

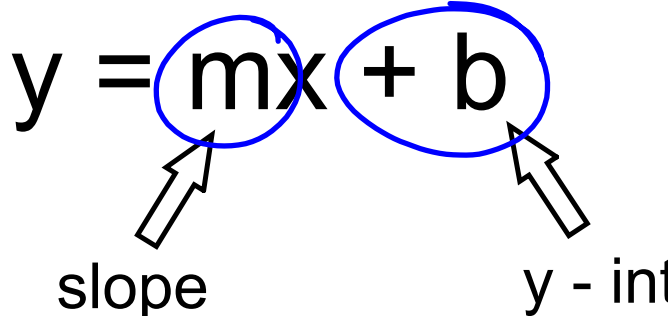
$$\left(\frac{3+(-1)}{2}, \frac{7+2}{2} \right)$$

$$\left(1, \frac{9}{2} \right)$$

$$(1, 4.5)$$

Equation of a Line

$$y = mx + b$$



Determine an equation for a line connecting the points

$(-2, 3)$ and $(3, 5)$
 x_1, y_1 and x_2, y_2

$$m = \frac{2}{5}$$

$$b = \frac{19}{5}$$

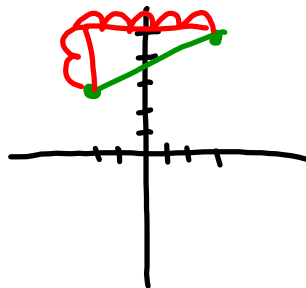
$$y = \frac{2}{5}x + \frac{19}{5}$$

$$y = 0.4x + 3.8$$

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

$$= \frac{5 - 3}{3 - (-2)}$$

$$= \frac{2}{5}$$



$$y = mx + b$$

$$5 = \frac{2}{5}(3) + b$$

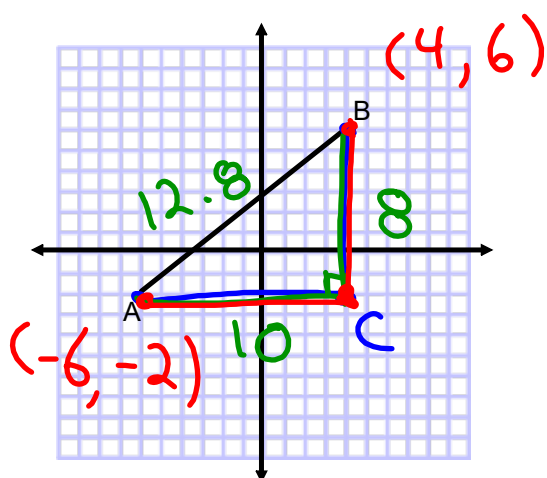
$$-\frac{6}{5} \quad 5 = \frac{6}{5} + b$$

$$\frac{25}{5} - \frac{6}{5} = b$$

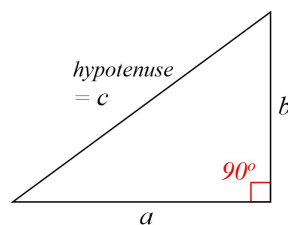
$$\frac{19}{5} = b$$

Length of a line segment

Determine the length of the line segment below



Pythagorean Theorem



$$c^2 = a^2 + b^2$$

$$8^2 = 64 \quad 10^2 = 100$$

$$\sqrt{164} = 12.8$$

Length of a Line

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

$$l^2 = a^2 + b^2$$

Determine the length of the line segment connecting:

1. (x_1, y_1) and (x_2, y_2)
 $(3, 5)$ and $(-1, 4)$

$$\begin{aligned}l &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\&= \sqrt{(-1 - 3)^2 + (4 - 5)^2} \\&= \sqrt{(-4)^2 + (-1)^2} \\&= \sqrt{16 + 1} \\&= \sqrt{17} \\&= 4.1\end{aligned}$$

$$l^2 = (4)^2 + (1)^2$$

$$l^2 = 16 + 1$$

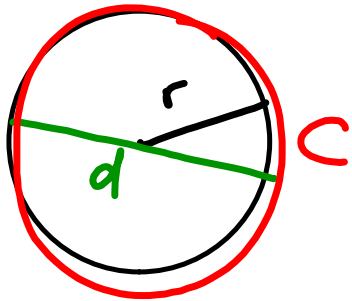
$$l^2 = 17$$

$$l = \sqrt{17}$$

$$= 4.1$$

2. $(-3, -3)$ and $(2, 2)$

Equation of a Circle



$$\text{Area} = \pi r^2$$

$$C = 2\pi r = \pi d$$

$$x^2 + y^2 = r^2$$

1. A triangle has vertices at $A(7, -4)$, $B(5, -6)$ and $C(2, 2)$

Determine the equation of the median from

2. Determine the equation of the perpendicular bisector of the segment DE if $D(3, 4)$ and $E(7, 3)$

Work

pg. 95 # 2, 4, 7, 8, 11, 13

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