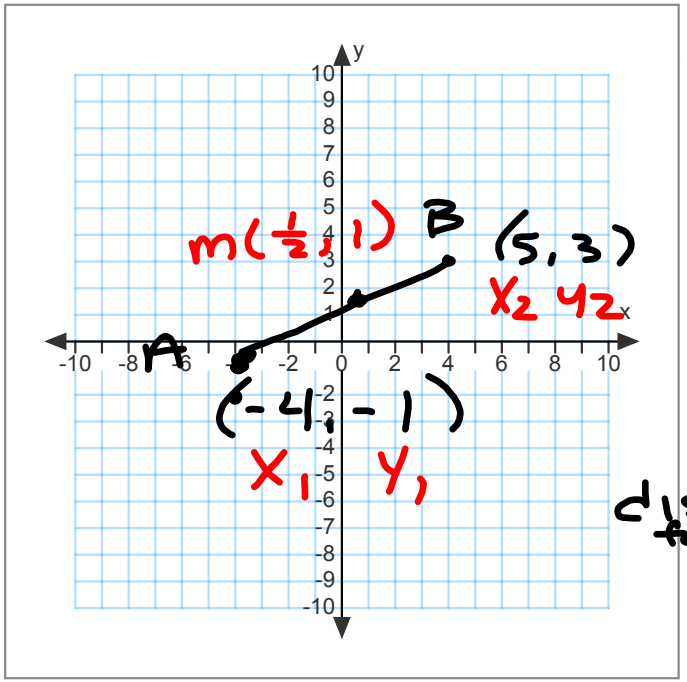
Distance and Midpoint Formula

Midpoint Formula: $\left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2}\right)$

* used to find the midpoint between 2 points

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

* used to find the length of a segment given two points



Find the midpoint and distance of the segment:

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

$= \left(\frac{5+-4}{2}, \frac{3+-1}{2}\right)$

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

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

$AB = \sqrt{(5-(-4))^2+(3-(-1))^2}$

$= \sqrt{(9)^2+(4)^2}$

$= \sqrt{81+16}$

$AB = \sqrt{97}$

$AB \approx 9.8$

2. An endpoint and a midpoint are given. Find the coordinates of the other endpoint.

(-17, -29)

Endpoint: (-1, 9) Midpoint: (-9, -10) Endpt (x, y)

$2\left(\frac{-1+x}{2}\right)=(-9)^2$ $2\left(\frac{9+y}{2}\right)=(-10)^2$

$-1+x=-18$ $9+y=-20$

$x=-17$ $y=-29$

endpoint: (-17, -29)

3. Write the equation of the perpendicular bisector of the segment joining (-3, 7) and (5, 1) using point-slope form. Put your final equation in slope-intercept form.

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

$m = \frac{4}{3}$

Pt: $(1, 4)$

$y - 4 = \frac{4}{3}(x - 1)$

$y - 4 = \frac{4}{3}x - \frac{4}{3} + 4$

$y = \frac{4}{3}x - \frac{4}{3} + \frac{12}{3}$

$$y = \frac{4}{3}x + \frac{8}{3}$$

$(-3, 7)$ $(5, 1)$

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

$\left(\frac{-3+5}{2}, \frac{7+1}{2}\right)$

$(1, 4)$

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

$m = \frac{1-7}{5-(-3)} = \frac{-6}{8} = -\frac{3}{4}$

opposite Reciprocals