2.1 The Distance and Midpoint Formulae

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

Ex.1 Find the distance between $A \underset{x_1 \ y_1}{(-4, 1)}$;
$B \underset{x_2 \ y_2}{(3, -1)}$.

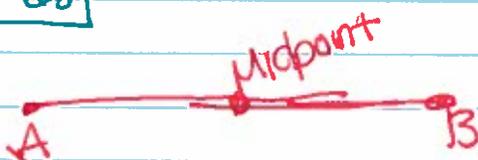$d = \sqrt{(3 - -4)^2 + (-1 - 1)^2}$
$d = \sqrt{7^2 + -2^2}$
$d = \sqrt{49 + 4}$
$d = \sqrt{53} = \boxed{7.28}$

Ex.2 Find EF given $E(-7, -2)$ and $F(11, 3)$.
$d = \sqrt{(11 - -7)^2 + (3 - -2)^2}$
$d = \sqrt{18^2 + 5^2}$
$d = \sqrt{324 + 25}$
$d = \sqrt{349} = \boxed{18.68}$

Midpoint Formula

Midpoint

A B

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

Ex.1 Find the midpoint of $\overline{GH}$ given $\underset{x_1 \ y_1}{\overset{G}{(7, -5)}}$ and
$H \underset{x_2 \ y_2}{(9, -1)}$.

$M = \left(\dfrac{7 + 9}{2}, \dfrac{-5 + -1}{2} \right) = \left(\dfrac{16}{2}, \dfrac{-6}{2} \right) = (8, -3)$

Ex.2 Find the midpoint of ST given $S(-7, 4)$
$T(3, -4)$.
$M = \left(\dfrac{-7 + 3}{2}, \dfrac{4 + -4}{2} \right) = \left(\dfrac{-4}{2}, \dfrac{0}{2} \right) = (-2, 0)$