

1.6 Midpoint & Distance Formula

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

Ex: Find M between $A(-1, 3)$
and $B(-2, 6)$

$$\begin{aligned} M &= \left(\frac{-1 + -2}{2}, \frac{3 + 6}{2} \right) \\ &= \left(-\frac{3}{2}, \frac{9}{2} \right) \end{aligned}$$

Ex: The midpoint of \overline{AB} is $(2, -6)$ and $B(-2, 4)$. Find the endpoint A .

$$(2, -6) = \left(\frac{-2+x}{2}, \frac{4+y}{2} \right)$$

~~$$\frac{-2+x}{2} = 2$$~~

~~$$\frac{4+y}{2} = -6$$~~

$$\begin{array}{r} -2+x = 4 \\ +2 \quad +2 \\ \hline x = 6 \end{array}$$

$$\begin{array}{r} 4+y = -12 \\ -4 \quad -4 \\ \hline y = -16 \end{array}$$

$$A(6, -16)$$

Distance Formula

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

Ex: Find AB if A is $(-6, 1)$
and B is $(0, -3)$.

$$\begin{aligned} d &= \sqrt{(-6 - 0)^2 + (1 - (-3))^2} \\ &= \sqrt{(-6)^2 + (4)^2} \\ &= \sqrt{36 + 16} \\ &= \sqrt{52} \end{aligned}$$

HW: p. 47
10, 12-17, 30