

Length of a Line Segment

1. What is the distance from the origin to the point  $(-1, -4)$ ?

Distance Formula:

$$P_1P_2 = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

MEMORIZE!

$$(0, 0) \text{ \& } (-1, -4)$$

$$d = \sqrt{(\Delta x)^2 + (\Delta y)^2}$$

$$= \sqrt{(-1-0)^2 + (-4-0)^2}$$

$\therefore \sqrt{17}$  units

$$= \sqrt{1 + 16}$$

$$= \sqrt{17}$$

Ex.2 Find the length of the line segments with the following endpoints.

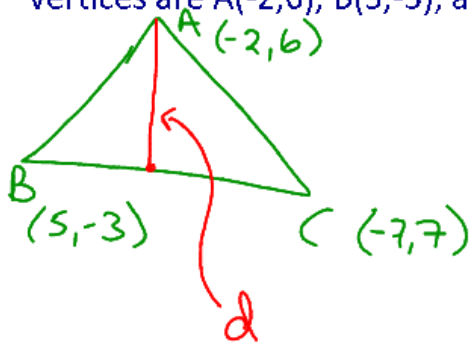
a) A (-3,0) and B (-3,2)

$$\begin{aligned} l_{AB} &= \sqrt{(-3 - (-3))^2 + (2 - 0)^2} \\ &= \sqrt{0 + 4} \\ &= 2 \end{aligned}$$

b) C(-4,7) and D(3,1)

$$\begin{aligned} l_{CD} &= \sqrt{(3 - (-4))^2 + (1 - 7)^2} \\ &= \sqrt{49 + 36} \\ &= \sqrt{85} \end{aligned}$$

Ex. 3 Determine the length of the median from vertex A of a triangle whose vertices are A(-2,6), B(5,-3), and C(-7,7).



① Midpoint BC

$$\begin{aligned} M_{BC} &= \left( \frac{-7+5}{2}, \frac{7+(-3)}{2} \right) \\ &= (-1, 2) \end{aligned}$$

② Distance from A to  $M_{BC}$   
 (-2,6) (-1,2)

$$\begin{aligned} d &= \sqrt{(\Delta x)^2 + (\Delta y)^2} \\ &= \sqrt{(-1 - (-2))^2 + (2 - 6)^2} \\ &= \sqrt{1 + 16} \quad \therefore \text{length of median} \\ &= \sqrt{17} \quad \text{is } \sqrt{17} \text{ units} \end{aligned}$$