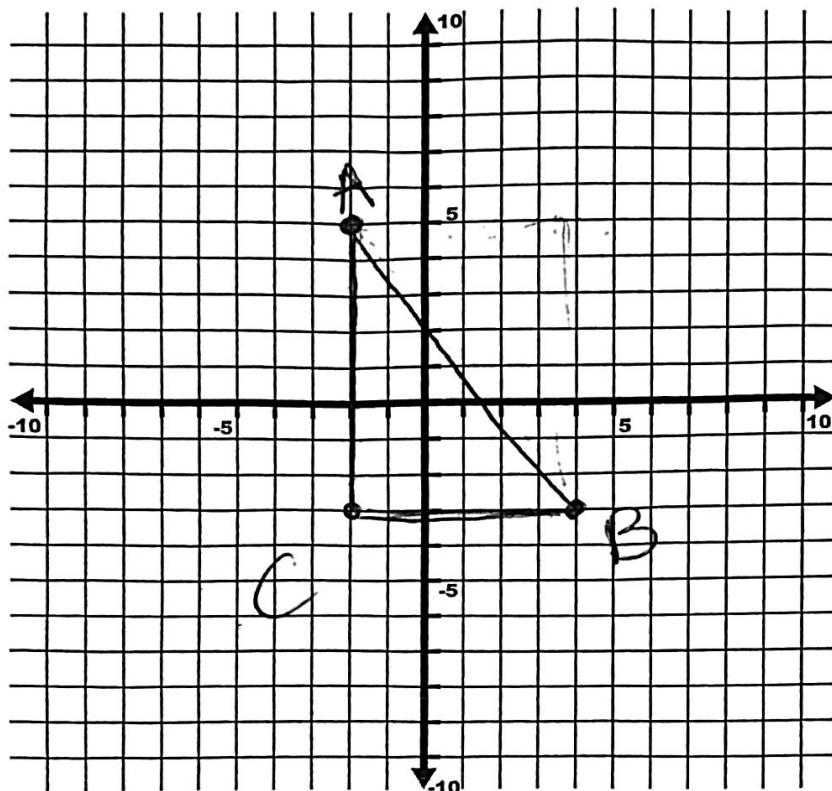


Coordinate Geometry

Graph: A(-2,5) B(4,-3) and C(-2,-3)

What is the distance between points A and B?



Pythagorean theorem

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

~~6² + 8² = c²~~

$$36 + 64 = 100 = c^2$$

$$\sqrt{100} = \sqrt{c^2}$$

$$10 = c$$

C and B?
6 units

A and C?
8 units

Distance Formula:

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

x_1, y_1 x_2, y_2

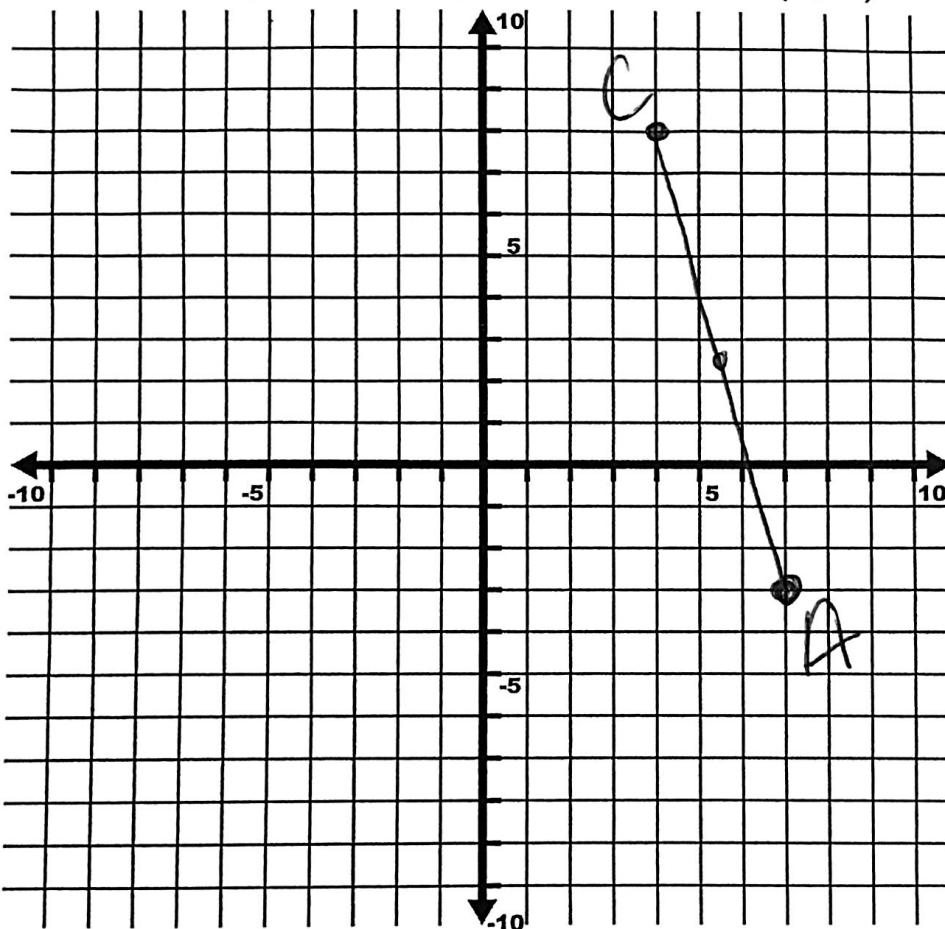
Find the length of the line segment that joins R(-3,6) and S(0,2).

$$\begin{aligned} & \sqrt{(0 - -3)^2 + (2 - 6)^2} \\ & \sqrt{3^2 + (-4)^2} \end{aligned} \quad \begin{aligned} & = \sqrt{9 + 16} \\ & = \sqrt{25} = 5 \end{aligned}$$

Find the Lengths from the previous page with this formula.

$$6 + 8$$

Find the midpoint of segment AC with A(7,-3) and C(4,8)



How to Find it?
Half + Half
↔ ↑

Midpoint Formula

The midpoint theorem states that for any point $A(x_1, y_1)$ and $B(x_2, y_2)$ the midpoint of segment AB has coordinates of

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

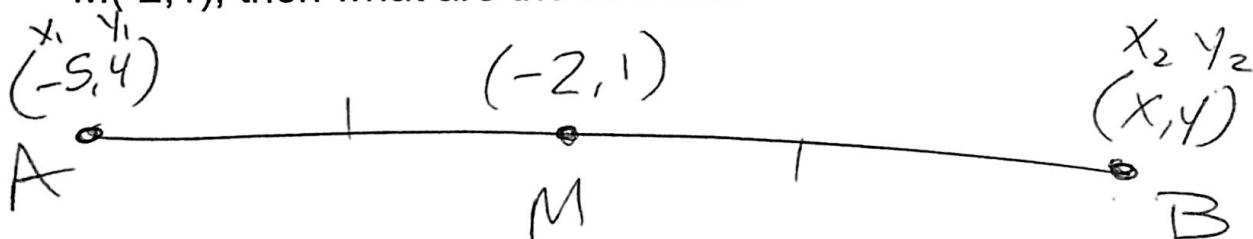
$$A\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

~~$C(4, 8)$~~

$$\left(\frac{7+4}{2}, \frac{-3+8}{2} \right)$$

$$\left(\frac{11}{2}, \frac{5}{2} \right)$$

- If $A(-5, 4)$ and $B(x, y)$ are endpoints of segment AB with midpoint $M(-2, 1)$, then what are the coordinates of B?



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

$$2 \cdot \frac{-5+x}{2} = -2 \cdot 2$$

$$\left(\frac{-5+x}{2}, \frac{4+y}{2} \right)$$

$$\begin{aligned} -5+x &= -4 \\ +5 &+5 \\ x &= 1 \end{aligned}$$

$$-2$$

$$1$$

$$2 \cdot \frac{4+y}{2} = 1 \cdot 2$$

$$\begin{aligned} 2+4 &= 2 \\ -4 &-4 \\ y &= -2 \end{aligned}$$

$$(1, -2)$$