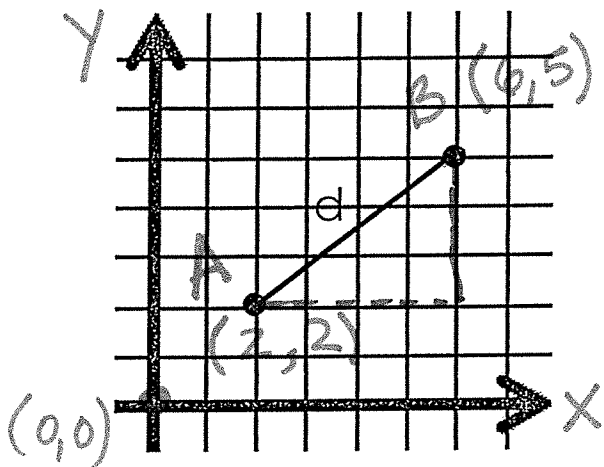


## The Distance Formula

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

Used to find the distance between two points on the coordinate plane.



Example 1:

Find the distance between  $(-3, 1)$  and  $(2, 3)$ .

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

$$d = \sqrt{(2 - (-3))^2 + (3 - 1)^2}$$

$$d = \sqrt{5^2 + 2^2}$$

$$d = \sqrt{25 + 4} = \boxed{\sqrt{29} = d}$$

Example 2:

Find the distance between  $(-2, 1)$  and  $(2, 5)$ .

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

$$d = \sqrt{(2 - (-2))^2 + (5 - 1)^2}$$

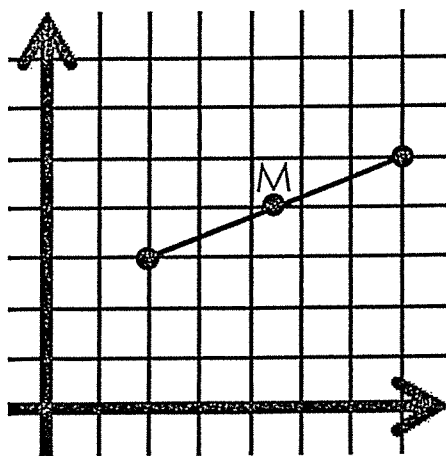
$$d = \sqrt{4^2 + 4^2} = \sqrt{16 + 16}$$

$$d = \sqrt{32} = \sqrt{16 \cdot 2} = \boxed{4\sqrt{2} = d}$$

## The Midpoint Formula

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

The midpoint of a line segment is the point on the segment that is equidistant from the endpoints.



Example 3: Find the midpoint of the line segment with endpoints  $(-3, -1)$  and  $(7, -5)$ .

Example 4: Find the midpoint of the line segment with endpoints  $(6, -3)$  and  $(4, -7)$ .