

Chapter 12
Section 6

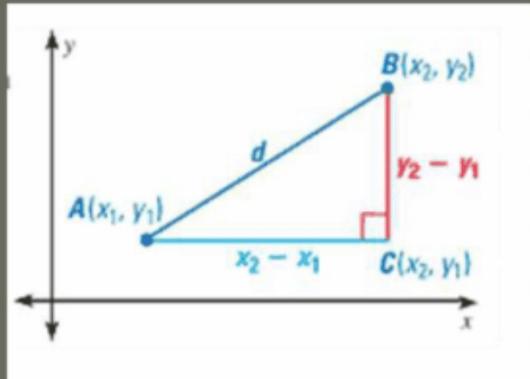
Distance &
Midpoint Formulas

Distance Formula

THE DISTANCE FORMULA

The distance d between the points (x_1, y_1) and (x_2, y_2) is

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



$$d^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2.$$

Examples:

1. $(1, 4), (-2, 3)$

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

$$d = \sqrt{(-2-1)^2 + (3-4)^2}$$

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

$$d = \sqrt{9+1}$$

$$d = \boxed{\sqrt{10}}$$

2. $(3, 7), (-4, -5)$

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

$$d = \sqrt{(-4-3)^2 + (-5-7)^2}$$

$$d = \sqrt{(-7)^2 + (-12)^2}$$

$$d = \sqrt{49+144}$$

$$\boxed{d = \sqrt{193}}$$

Midpoint Formula

THE MIDPOINT FORMULA

The midpoint between (x_1, y_1) and (x_2, y_2) is $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$.

Examples

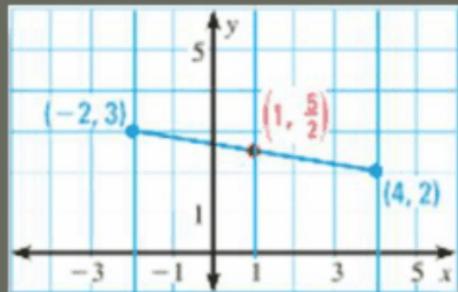
◎ 1.) $(-2, 3), (4, 2)$

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

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

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

$$\boxed{(1, 2.5)}$$



Examples

◎ 2. $(x_1, y_1), (x_2, y_2)$

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

$$\left(\frac{3+4}{2}, \frac{7+(-1)}{2} \right)$$

$$\boxed{(3.5, 3)}$$

CLASSWORK

- ◎ Pg 748 # 3-5, 10-12

Homework

- ◎ Page 748-748 # 14-18, 34-37