

Math 0310 Homework Exercise Supplement
Sect. 13.1: Midpoint and Distance Formulas

The midpoint of a segment is the point that divides the segment into two congruent pieces. The midpoint of the segment that joins points (x_1, y_1) and (x_2, y_2) is the point $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$.

To find the midpoint of the segment joining, (x_1, y_1) and (x_2, y_2) , average the two x values and average the two y values.

Find the midpoint of the segment with the following endpoints:

Example 1. $(5, 8)$ and $(2, 6)$

Answer:

$$\left(\frac{5+2}{2}, \frac{8+6}{2}\right)$$

$$\left(\frac{7}{2}, \frac{14}{2}\right)$$

$$\left(\frac{7}{2}, 7\right)$$

Example 2. $(-8, 3)$ and $(4, -1)$

Answer:

$$\left(\frac{-8+4}{2}, \frac{3+(-1)}{2}\right)$$

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

$$(-2, 1)$$

The distance, d , between two points with coordinates (x_1, y_1) and (x_2, y_2) is given by

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

Find the distance between the given points:

Example 3. $(4, -5)$ and $(-2, 3)$

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

$$d = \sqrt{36 + 64}$$

$$d = \sqrt{100}$$

$$d = 10$$