1. Length of a Line Segment

To calculate the length of a line segment between two points $A(x_1, y_1)$ and $B(x_2, y_2)$, use the **distance** formula:

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

Example:

Find the length of the line segment joining $A(1, 2)$ and $B(5, 6)$.

$$\text{Length} = \sqrt{(5 - 1)^2 + (6 - 2)^2} = \sqrt{4^2 + 4^2} = \sqrt{16 + 16} = \sqrt{32} \approx 5.66$$

2. Midpoint of a Line Segment

To find the midpoint of a line segment between $A(x_1, y_1)$ and $B(x_2, y_2)$, use the **midpoint formula:**

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

Example:

Find the midpoint of the line segment joining $A(1, 2)$ and $B(5, 6)$.

$$\text{Midpoint} = \left(\frac{1 + 5}{2}, \frac{2 + 6}{2} \right) = \left(\frac{6}{2}, \frac{8}{2} \right) = (3, 4)$$