For our purposes, a vector is essentially a directed arrow. A vector has the properties of length and direction, but not position. Thus, we say two vectors are equal if they have the same length and same direction.

If $A, B$ are two points then $\overrightarrow{AB}$ is the vector that joins $A$ and $B$; it has length equal to the length of the line segment that joins $A$ and $B$, and direction parallel to an arrow pointing from $A$ to $B$. We assign coordinates to $\overrightarrow{AB}$ by subtracting the respective coordinates of $A$ from those of $B$. The position vector of a point $A$ is the vector $\overrightarrow{OA}$ where $O$ is the origin, relative to which, $A$ has coordinates. (So $A$ and $\overrightarrow{OA}$ expressed as coordinates look the same.)

**Example.** Suppose $A = (1, 3)$ and $B = (2, 7)$ then

$$\overrightarrow{AB} = B - A = (2, 7) - (1, 3) = (2 - 1, 7 - 3) = (1, 4).$$

Suppose and $C = (5, 4)$ and $D = (6, 8)$ then

$$\overrightarrow{CD} = D - C = (6, 8) - (5, 4) = (6 - 5, 8 - 4) = (1, 4).$$

Observe that $\overrightarrow{AB}$ and $\overrightarrow{CD}$ are equal despite the fact they connect different pairs of points in space.