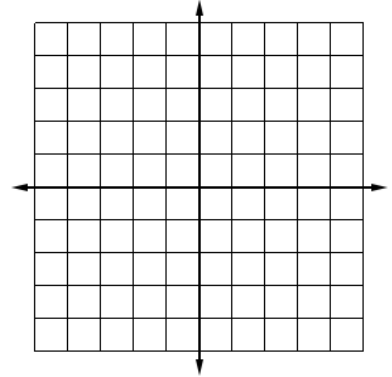


Lesson 9.1: Vectors in Two Dimensions

Vectors in the Coordinate Plane

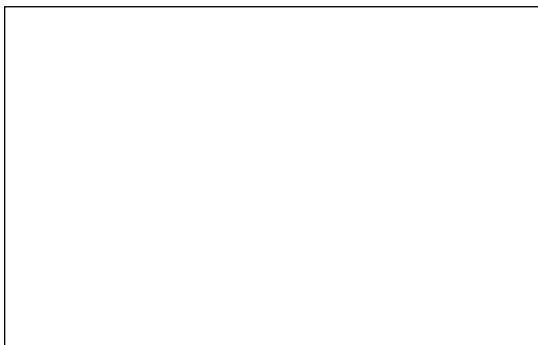
Component Form of a Vector



Examples:

1. Find the component form of the vector \vec{u} with initial point $(-2,5)$ and terminal point $(3,7)$.
2. If a vector $\vec{v} = \langle 3,7 \rangle$ is sketched with initial point $(2,4)$, what is its terminal point?

Magnitude of a Vector



Examples: Find the magnitude of each vector.

1. $\vec{u} = \langle 2, -3 \rangle$
2. $\vec{v} = \langle 5, 0 \rangle$

Algebraic Operations on Vectors

For the following properties, let $\vec{u} = \langle a_1, b_1 \rangle$ and $\vec{v} = \langle a_2, b_2 \rangle$.

Examples: Let $\vec{u} = \langle 2, -3 \rangle$ and $\vec{v} = \langle -1, 2 \rangle$.

1. Find $\vec{u} + \vec{v}$
2. Find $\vec{u} - \vec{v}$
3. Find $2\vec{u} + 3\vec{v}$

Vectors in Terms of \vec{i} and \vec{j}

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Example: Write $\vec{u} = \langle 5, -8 \rangle$ in terms of \vec{i} and \vec{j} .

Direction of a Vector

The direction of a vector is defined by an _____ .

Vertical and Horizontal Components of a Vector

Examples:

1. A vector \vec{v} has a length 8 and direction $\frac{\pi}{3}$. Find the horizontal and vertical components, and write \vec{v} in terms of \vec{i} and \vec{j} .

2. Find the direction of the vector $\vec{u} = -\sqrt{3}\vec{i} + \vec{j}$.