

Advanced Math

6-3

Vectors in a Plane

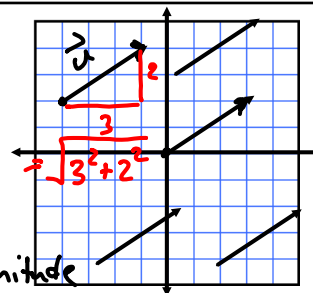
Scalar - a number that only has one measuring value

Vector - a number with two measuring values,
usually magnitude and direction.

To the right is a pictorial representation of a vector.

Properly name the vector: $\vec{u} = (-4, 2), (-1, 4)$

Magnitude of the vector: $\sqrt{13} = \|\vec{u}\|$



Definition of Equivalent vector -
vectors with both the same magnitude and direction.



Definition of Standard Position -
Starts at the origin

Draw the equivalent vector in standard position.

Write the vector in Component Form - $\vec{u} = \langle 3, 2 \rangle$

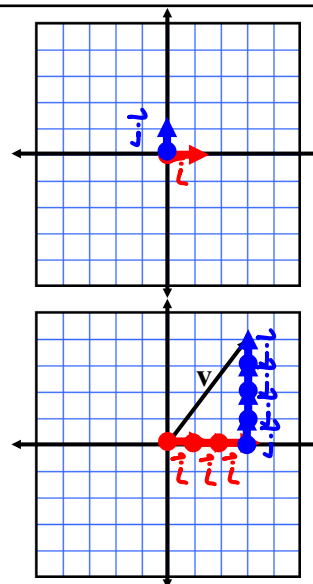
Definition of Unit Vector - magnitude: 1

Definition of Zero Vector - magnitude: 0

Standard Unit Vectors -
 $\vec{i} = \langle 1, 0 \rangle$ 
 $\vec{j} = \langle 0, 1 \rangle$ 

Write \vec{v} as a linear combination of unit vectors.

$$\vec{v} = 3\vec{i} + 4\vec{j}$$



Given \mathbf{u} and \mathbf{v} at the right.

What is the component form of \mathbf{u} ? $\langle 4, 1 \rangle$

What is the component form of \mathbf{v} ? $\langle -2, 2 \rangle$

Graphically and Algebraically, what is $2\mathbf{v}$?

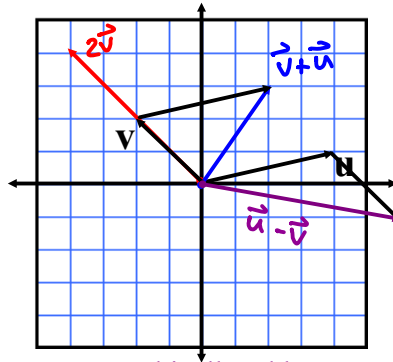
$$2\vec{v} = \langle -4, 4 \rangle$$

Graphically and Algebraically, what is $\mathbf{v} + \mathbf{u}$?

$$\vec{v} + \vec{u} = \langle 2, 3 \rangle$$

Graphically and Algebraically, what is $\mathbf{u} - \mathbf{v}$?

$$\vec{u} - \vec{v} = \langle 6, -1 \rangle$$



To graphically add vectors, place the starting point of the added vector at the terminal point of the first vector. The *resultant* vector connects the starting point of the first vector and the terminal point of the added vector.

Assignment:
pg. 540
1-24 all,
37-42 all.