Pre-Calculus Vectors in a Plane (6.3)

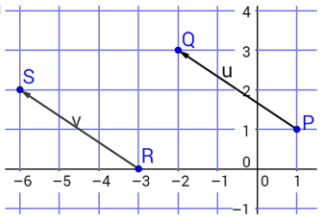
Guided Notes

Directed Line Segments

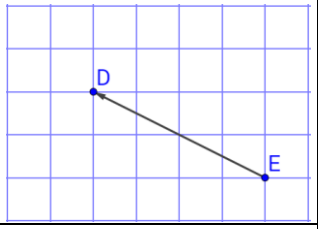
When describing force and velocity, it's important to represent their magnitude and direction. A directed line segment $\overrightarrow{PQ}$ has an initial point P and a terminal point Q. Its magnitude, or length can be found using the distance formula. The set of all directed line segments in a plane equivalent to $\overrightarrow{PQ}$ is a vector **v**.

Show Two Vectors are Equivalent

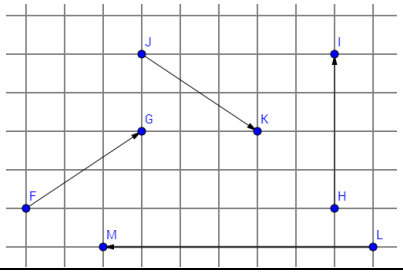
Let **u** be the directed line segment from P(1, 1) to Q(-2, 3), and let **v** be the directed line segment from R(-3, 0) to S(-6, 2). Show that **u** and **v** are equivalent.



A vector whose initial point is the origin (0, 0) is said to be in standard position. The terminal point of a vector in standard position is at (v_1, v_2) and is called the component form of the vector. The component form of $\overrightarrow{ED}$ is



Name the vectors. Write their component forms.



Find the component form of the vector **v** with the initial point J(1, 4) and terminal point K(4, 2).

Magnitude of a Vector

The component form of a vector **v** in standard form is v = $\langle a, b \rangle$. The magnitude or length of **v** is

Adding Vectors

The sum or resultant of two vectors is also a vector. Vectors **u** and **v** can be added using tail-to-head addition or parallelogram addition.

Given **u** = $\langle -2, 1 \rangle$ and **v** = $\langle 4, 3 \rangle$

Find **u** + **v**.

Find **u** – **v**.

Find 4**u**.

The **direction angle** is the measure of the angle between the vector and the positive x-axis.

Find the direction angle for $\langle 5, 4 \rangle$.

Find the direction angle for $\langle -3, 8 \rangle$.

Unit Vector =

Note that u is a scalar multiple of v. The vector u is a vector with a magnitude of 1 and is in the same direction as v.

Find the unit vector of v = $\langle -3, 8 \rangle$

Standard Unit Vectors and Linear Combination Notation

Section 6.3 p. 427; 11 – 42 x 3's, 53, 56