

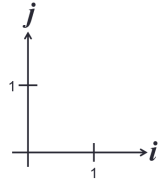
Unit Vectors Notes

What is a UNIT VECTOR?

• A unit vector is a vector that is 1 unit long!

• \vec{i} is a unit vector ... $\vec{i} = \langle 1, 0 \rangle$.

• \vec{j} is a unit vector ... $\vec{j} = \langle 0, 1 \rangle$.



a Vector in two forms ...

A vector in component form ...

... can also be written as ...

... the sum of unit vectors

Example 1 ... initial point: (-1, 5) terminal point: (-2, -3)

- Find component form.
- Write as a sum of unit vectors.
- Find the magnitude.
- Find the direction. Use $[0^\circ, 360^\circ)$.

Example 2 ... Vector Operations

- Given $\vec{v} = 3\vec{i} - \vec{j}$ and $\vec{w} = -2\vec{i} + 3\vec{j}$.
- Find:
 - $4\vec{v} + 2\vec{w}$
 - $\vec{v} - 3\vec{w}$
 - $\frac{1}{2}\vec{v} + \frac{1}{2}\vec{w}$

a unit vector in the direction of \vec{v} ...

A unit vector, \vec{u} , in the direction of \vec{v} ...

... is given by: $\vec{u} = \frac{\vec{v}}{\|\vec{v}\|}$

Example 3 ... Find a unit vector in the direction of each given vector.

a) $\vec{v} = \langle 3, -4 \rangle$

b) $-6\vec{i} + 4\vec{j}$