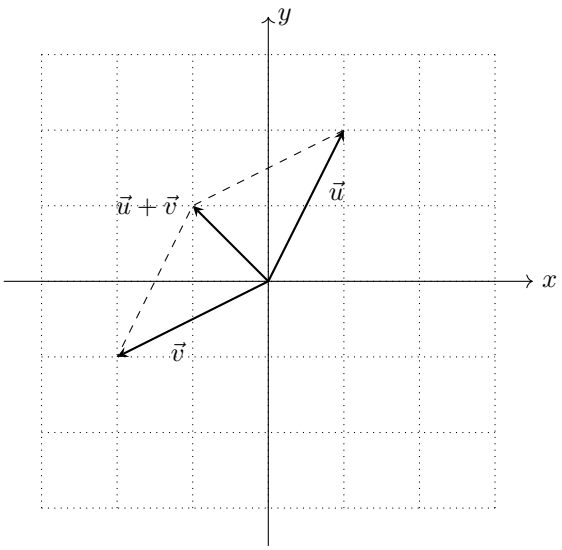
MATH 2D Prep: Vector Geometry

1. Given $\vec{u} = (1, 2)$, $\vec{v} = (-2, -1)$, draw vectors $\vec{u}$, $\vec{v}$, and $\vec{u} + \vec{v}$.

Solution:



2. Suppose $\vec{u} = (1, 1)$, $\vec{v}$ is in the same direction as $\vec{u}$, and $|\vec{v}| = |\vec{u}|^2$. Find $\vec{v}$

Solution:

$$|\vec{u}| = \sqrt{1^2 + 1^2} = \sqrt{2}$$

$\vec{v}$ is in the same direction as $\vec{u}$, so there is a real number $c > 0$ such that

$$\vec{v} = c\vec{u}$$

Because $c > 0$, we have

$$|\vec{v}| = c|\vec{u}| = \sqrt{2}c,$$

but we are given

$$|\vec{v}| = |\vec{u}|^2 = 2$$

So $\sqrt{2}c = 2$, this means $c = \sqrt{2}$. So

$$\vec{v} = \sqrt{2}\vec{u} = (\sqrt{2}, \sqrt{2})$$