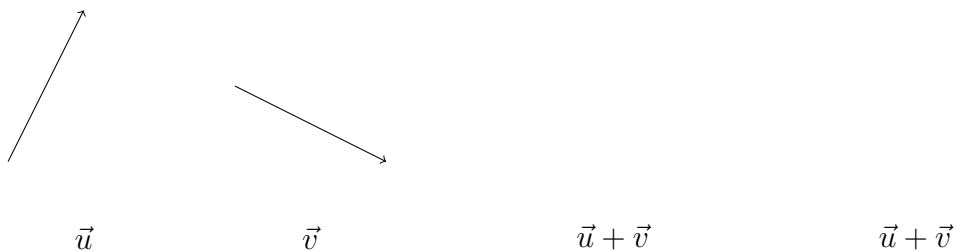


Homework I First-Half

Due in class Monday July 09 2017

1. The vectors \vec{u} and \vec{v} are given as below. Sketch $\vec{u} + \vec{v}$ and $\vec{u} - \vec{v}$



2. If $\vec{u} = (1, 3)$ and $\vec{v} = (-2, 5)$, compute $\vec{u} + \vec{v}$, $\vec{u} - \vec{v}$, $-3\vec{u}$ and $\vec{u} \cdot \vec{v}$
3. Find a unit vector that has the opposite direction as $\vec{v} = (5, -12)$
4. \vec{u} and \vec{v} are vectors such that $(\vec{u} + \vec{v}) \perp (\vec{u} - \vec{v})$, prove $|\vec{u}| = |\vec{v}|$.
5. $f(x, y) = x^2 + xy + 2y^2$. $\vec{u} = (\frac{3}{5}, -\frac{4}{5})$ is a unit vector.
- (i). Compute the gradient ∇f
- (ii). Compute the directional derivative $D_{\vec{u}}f(1, 3)$.