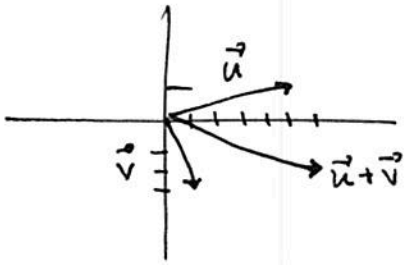
MTH 162, Quiz #12, Spring 2025 Name KEY

Instructions: Show all work. Use exact answers unless specifically asked to round. Answer all parts of each question.

1. Use $\vec{u} = \langle 5,1 \rangle, \vec{v} = \langle 1,-3 \rangle$ to find the following.
   a. Find $\vec{u} + \vec{v}$, then graph $\vec{u}, \vec{v}$ and $\vec{u} + \vec{v}$ on the same graph.

$\langle 6, -2 \rangle$



   b. $\|\vec{u}\|$ $\sqrt{25+1} = \sqrt{26}$

   c. Write a unit vector in the direction of $\vec{u}$

$\left\langle \frac{5}{\sqrt{26}}, \frac{1}{\sqrt{26}} \right\rangle$

   d. Find $\vec{u} \cdot \vec{v}$

$5 - 3 = 2$

   e. Find the angle between $\vec{u}$ and $\vec{v}$

$\cos\theta = \frac{2}{\sqrt{26}\sqrt{10}} \approx 82.9°$ or 1.4464 radians

   f. What is the projection of $\vec{u}$ onto $\vec{v}$?

$\frac{2}{10}\langle 1, -3 \rangle = \left\langle \frac{2}{10}, -\frac{6}{10} \right\rangle$

$= \left\langle \frac{1}{5}, -\frac{3}{5} \right\rangle$