Please PRINT your name _____

No calculators, cell phones, computers, notes, etc.

Circle your answer. Make your work correct, complete and coherent.

Please take a picture of your quiz (for your records) just before you turn the quiz in. I will e-mail your grade and my comments to you. I will keep your quiz.

The quiz is worth 5 points. The solutions will be posted on my website later today.

Quiz 2, January 26, 2022

Express $\vec{v} = -\vec{i} + 3\vec{j}$ as the sum of a vector parallel to $\vec{b} = 3\vec{i} - 4\vec{j}$ and a vector perpendicular to $\vec{b}$. Check your answer. Make sure it is correct. Observe that

$$\text{proj}_{\vec{b}}\,\vec{v} = \frac{\vec{b}\cdot\vec{v}}{\vec{b}\cdot\vec{b}}\vec{b} = \frac{-3-12}{25}(3\vec{i} - 4\vec{j}) = \frac{-3}{5}(3\vec{i} - 4\vec{j}).$$

It follows that

$$\vec{v} - \text{proj}_{\vec{b}}\,\vec{v} = (-\vec{i} + 3\vec{j}) + \frac{-3}{5}(3\vec{i} - 4\vec{j}) = \frac{4}{5}\vec{i} + \frac{3}{5}\vec{j}.$$

We see that

$\vec{v} = \frac{-3}{5}(3\vec{i} - 4\vec{j}) + \frac{4}{5}\vec{i} + \frac{3}{5}\vec{j}$
with $\frac{-3}{5}(3\vec{i} - 4\vec{j})$ parallel to $\vec{b}$ and
$\frac{4}{5}\vec{i} + \frac{3}{5}\vec{j}$ perpendicular to $\vec{b}$.

Be sure to check that all three assertions are true.