

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 25, 2022

Express $\vec{v} = 3\vec{i} + 5\vec{j}$ as the sum of a vector parallel to $\vec{b} = 2\vec{i} + 3\vec{j}$ and a vector orthogonal to \vec{b} . **Check your answer. Make sure it is correct.**

Answer: We compute

$$\text{proj}_{\vec{b}} \vec{v} = \frac{\vec{v} \cdot \vec{b}}{\vec{b} \cdot \vec{b}} \vec{b} = \frac{6 + 15}{4 + 9} (2\vec{i} + 3\vec{j}) = \frac{42}{13} \vec{i} + \frac{63}{13} \vec{j}.$$

We also compute

$$\vec{v} - \text{proj}_{\vec{b}} \vec{v} = -\frac{3}{13} \vec{i} + \frac{2}{13} \vec{j}.$$

We see that

$$\vec{v} = \left(\frac{42}{13} \vec{i} + \frac{63}{13} \vec{j} \right) + \left(-\frac{3}{13} \vec{i} + \frac{2}{13} \vec{j} \right),$$

with $\left(\frac{42}{13} \vec{i} + \frac{63}{13} \vec{j} \right)$ parallel to \vec{b}
and $\left(-\frac{3}{13} \vec{i} + \frac{2}{13} \vec{j} \right)$ perpendicular to \vec{b} .