Some problems:

1. Find the unit vectors that are parallel to the tangent line of $f(x) = x^2 - 2x + 3$ through the point $(2, 3)$.
2. Find the orthogonal projection of $v = (1, 2, 3)$ onto $\mathbf{k}$. Explain why your answer makes sense.

Suggested extra problems:

1. Find the unit vectors that are parallel to the tangent line of $f(x) = x^2 - 2x + 3$ through the point $(2, 3)$.
2. Find the orthogonal projection of $v = (1, 2, 3)$ onto $\mathbf{k}$. Explain why your answer makes sense.
3. (Extra - 12.3.31 in the textbook) Find the acute angles between the curves at their points of intersection (The angles between two curves is the angle between their tangent lines at the point of intersection).

$$y = x^2, \qquad \text{and} \qquad y = x^3.$$

4. (Extra - 12.3.53 in the textbook) Use a scalar projection to show that the distance from a point $P_1(x_1, y_1)$ to the line $ax + by + c = 0$ is

$$\frac{|ax_1 + by_1 + c|}{\sqrt{a^2 + b^2}}.$$

   Use this formula to find the distance from the point $(-2, 3)$ to the line $3x - 4y + 5 = 0$.

5. (Extra - 12.3.32 in the textbook) Find the acute angles between the curves at their points of intersection (The angles between two curves is the angle between their tangent lines at the point of intersection).

$$y = \sin x, \qquad \text{and} \qquad y = \cos x, \qquad 0 \leqslant x \leqslant \frac{\pi}{2}.$$