

1. If $\mathbf{v} = \langle 3, -5 \rangle$ and $\mathbf{u} = \langle 2, 4 \rangle$ are vectors in \mathbf{R}^2 , find the following:

a. $3\mathbf{v} + 4\mathbf{u}$

Ans: $\langle 17, 1 \rangle$

b. $5\mathbf{u} - 2\mathbf{v}$

Ans: $\langle 4, 30 \rangle$

c. $|\mathbf{v}|$

Ans: $\sqrt{24}$

d. Find a unit vector that is parallel to \mathbf{u}

Ans: $\left\langle \frac{\sqrt{5}}{5}, \frac{2\sqrt{5}}{5} \right\rangle$

e. $\mathbf{v} \cdot \mathbf{u}$

Ans: -14

f. Is \mathbf{v} and \mathbf{u} perpendicular to each other? Explain

Ans: No, since $\mathbf{v} \cdot \mathbf{u} \neq 0$.

g. Find the angle formed between \mathbf{v} and \mathbf{u}

Ans: $\theta = \cos^{-1} \left(\frac{-7}{\sqrt{170}} \right) \approx 122.5^\circ$