

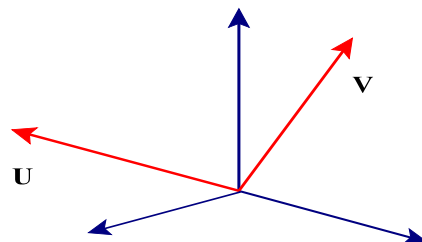
DIRECTIONS To receive full credit, you must provide complete legible solutions to the following problems in the space provided. No Attached papers. Transfer all your answers to the space provided.

1. Find the vector difference $\mathbf{v} - \mathbf{u}$ of the vectors with the given initial and terminal points, then illustrate by drawing vector difference on the coordinate system given.

\mathbf{V} : From $(0,0,0)$ to $(-4,3,5)$

\mathbf{u} : From $(0,0,0)$ to $(5,0,3)$

Ans _____

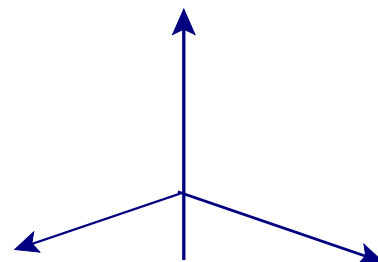


2. Find the sum of the given vectors.

$\mathbf{v} = 3\mathbf{i} + 5\mathbf{j} - 2\mathbf{k}$, $\mathbf{u} = 5\mathbf{k}$,

Illustrate geometrically.

Ans _____



3. Find $\mathbf{a} + \mathbf{b}$, $2\mathbf{a} + 3\mathbf{b}$, $\|\mathbf{a}\|$, $\|\mathbf{a} - \mathbf{b}\|$

$\mathbf{a} = \langle 4, -3, 2 \rangle$, $\mathbf{b} = \langle -2, 5, -3 \rangle$

Ans _____

Ans _____

Ans _____

Ans _____

4. A woman walks due west on the deck of a ship at 4 mi/h. The ship is moving north at a speed of 20 mi/h. Find the speed and direction of the woman relative to the surface of the water. illustrate using directed line segments.

5. Given $\mathbf{v} = 2\mathbf{i} + 3\mathbf{j} + 2\mathbf{k}$
a. a unit vector in the direction of \mathbf{v}

Ans _____

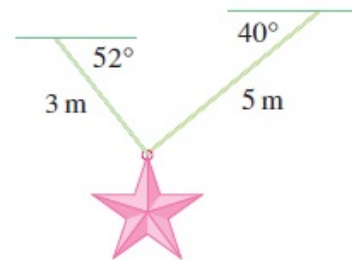
b. the direction cosines angles of \mathbf{v}

Ans _____

c. a vector of magnitude 3 parallel to \mathbf{v}

Ans _____

6. Ropes 3 m and 5 m in length are fastened to a holiday decoration that is suspended over a town square. The decoration has a mass of 4 kg. The ropes, fastened at different heights, make angles of 52° and 40° with the horizontal. Find the tension in each wire and the magnitude of each tension. (Use $g = 9.8 \text{ m/s}^2$ for the acceleration due to gravity. Round your answers to two decimal places.)



3 m rope tension: _____

3 m rope magnitude _____

5 m rope tension _____

5 m rope magnitude _____