

1.2{ 5, 9, 15, 17, 18, 30}

5 Find $\mathbf{u} \cdot \mathbf{v}$ when $\mathbf{u} = \begin{bmatrix} 1 \\ \sqrt{2} \\ \sqrt{3} \\ 0 \end{bmatrix}$ and $\mathbf{v} = \begin{bmatrix} 4 \\ -\sqrt{2} \\ 0 \\ -5 \end{bmatrix}$.

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9 Find $\|\mathbf{u}\|$ for $\mathbf{u} = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$, and give a unit vector in the direction of \mathbf{u} .

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15 Find the distance $d(\mathbf{u}, \mathbf{v})$ between \mathbf{u} and \mathbf{v} when $\mathbf{u} = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ and $\mathbf{v} = \begin{bmatrix} 2 \\ 3 \\ 1 \end{bmatrix}$.

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17 If \mathbf{u}, \mathbf{v} , and \mathbf{w} are vectors in \mathbb{R}^n , $n \geq 2$ and c is a scalar, explain why the following expressions make no sense:

(a) $\|\mathbf{u} \cdot \mathbf{v}\|$

(b) $\mathbf{u} \cdot \mathbf{v} + \mathbf{w}$

(c) $\mathbf{u} \cdot (\mathbf{v} \cdot \mathbf{w})$

(d) $c \cdot (\mathbf{u} + \mathbf{v})$

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18 Determine whether the angle between $\mathbf{u} = \begin{bmatrix} 3 \\ 0 \end{bmatrix}$ and $\mathbf{v} = \begin{bmatrix} -1 \\ 1 \end{bmatrix}$ is acute, obtuse, or a right angle.

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Let $A = (-3, 2)$, $B = (1, 0)$, and $C = (4, 6)$. Prove that $\triangle ABC$ is a right-angled triangle.

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