

Each problem is worth 5 points. Clear and complete justification is required for full credit.

Use the vectors $\vec{u} = 3\vec{i} + 2\vec{j} - \vec{k}$ and $\vec{v} = -2\vec{i} + \vec{j} + 2\vec{k}$ for the following problems:

1. Find $\|\vec{u}\|$.

$$\|\vec{u}\| = \sqrt{a^2 + b^2 + c^2} \quad a = 3 \quad b = 2 \quad c = -1$$

$$\|\vec{u}\| = \sqrt{3^2 + 2^2 + (-1)^2}$$

$$\|\vec{u}\| = \sqrt{9 + 4 + 1}$$

Well
done

$$\|\vec{u}\| = \sqrt{14}$$

2. Find a unit vector in the direction of \vec{v} .

$$\text{unit vector} = \frac{\vec{v}}{\|\vec{v}\|}$$

$$\|\vec{v}\| = \sqrt{4 + 1 + 4}$$

$$= \sqrt{9}$$

$$= 3$$

Excellent

$$\frac{-2\vec{i} + \vec{j} + 2\vec{k}}{3}$$

$$\therefore \text{the unit vector} = \frac{-2}{3}\vec{i} + \frac{1}{3}\vec{j} + \frac{2}{3}\vec{k}$$