

A Long Quiz

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Let $\vec{u} = 2i + j + 3k$, $\vec{v} = 3i + k$, and $\vec{w} = 2j + k$. Find

1. Write each vector in bracket notation, i.e. $\langle 3, 1, 2 \rangle$.

2.

- | | |
|-----|---------------|
| (a) | $v \times w$ |
| (b) | $u \times w$ |
| (c) | $u + w$ |
| (d) | $3u$ |
| (e) | $v \cdot w$. |

3. Find the normalization of u .

4. Find the projection of v onto u . (Don't remember the formula?? Derive it!)

5. Find a plane containing the three "points" u, v and w .

6. Find where the line containing v and w meets the plane determined by the equation $x - y - z + 1 = 0$. (It does not meet the plane is a valid answer!)

7. **Bonus**

- (a) Describe two properties of both the dot and cross product which are *similar to* usual multiplication of real numbers.
- (b) Describe two properties of both the dot and cross product which are *different from* usual multiplication of real numbers.