

MA 166: Quiz 2

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You have **15 minutes** to complete this quiz. You may work in groups, but you are not allowed to use any other resources.

Problem 1. Show that

$$x^2 + y^2 + z^2 - 6x - 4y + 6z = 0$$

is the equation of a sphere. Find the center and the radius of the sphere.

Problem 2. Describe in words the region in \mathbb{R}^3 represented by

- (a) $x = y$.
- (b) $x^2 + y^2 + z^2 > 1$.
- (c) $x^2 + y^2 < 1$.

Problem 3. Let $\mathbf{u} = 2\mathbf{i} + 2\mathbf{j} + \mathbf{k}$ and $\mathbf{v} = \mathbf{i} + 2\mathbf{j} - 3\mathbf{k}$. Find the following:

- (a) $\mathbf{u} \cdot \mathbf{v}$.
- (b) The cosine of the angle between \mathbf{u} and \mathbf{v} .
- (c) The projection of \mathbf{u} onto \mathbf{v} , i.e., $\text{proj}_{\mathbf{v}} \mathbf{u}$.