MA 166: Quiz 2

TA: Carlos Salinas

January 21, 2016

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 scalar projection of $\mathbf{u}$ onto $\mathbf{v}$, i.e., $\text{proj}_{\mathbf{v}}\, \mathbf{u}$.