Math 20550 Calculus III Tutorial   **Name:** _____
January 22, 2015

Tutorial Worksheet

Show all your work.

1. Find the vector given by the projection of $\mathbf{v} = \langle 3, 5, 4 \rangle$ onto $\mathbf{a} = \langle 1, 2, -2 \rangle$.

2. Find a vector perpendicular to the plane that passes through the three points $P(1, 4, 5)$, $Q(-2, 5, -2)$ and $R(1, -1, 0)$.

3. Is

$$x^2 - 2x + y^2 + z^2 + 7 = 1 - 5x + 2z$$

an equation of a sphere? If so, find the center of the sphere.

4. Let L be a straight line that passes through the points $A(2, 4, -3)$ and $B(3, -1, 1)$. At what point does this line intersect the yz-plane?

5. A tow truck drags a stalled car along a road. The chain makes an angle of $30°$ with the road and the tension in the chain is 1200 N. How much work is done by the truck in pulling the car 1 km?

6. Find an equation of the sphere that passes through the origin and has center $(3, -2, 5)$.

What is an equation of the intersection of this sphere with the yz-plane?