MATH 2415 Test 2   <u>Name:</u>

1. Consider the helix $\vec{r}(t) = \langle cos(3t), sin(3t), 2t \rangle$. Find the unit normal vector at time $t = \pi/3$. (Hint: the speed is constant.)

2. Consider the function $f(x, y) = x^2 y^2$ and the base point $(x_0, y_0) = (3, 3)$. Use the tangent plane approximation to estimate $f(3.01, 3.02)$.

3. Prove that $f(x, y) = 3x + 4y + 5$ is continuous at $(x, y) = (2, 1)$.