Math 107 Honors (Quiz 8) **Name** _____.

1. (13 points) Given the position vector of an object at time t is given by $\vec{r}(t) =< t, t, t^2 >$ for $-\infty < t < \infty$, find the velocity, speed, and acceleration of the object at $t = 0$. Then find the tangential component, a_T, the principal normal component, a_N, of acceleration, and the radius of curvature of the curve all at time $t = 0$. Clearly label your answers.

2. (7 points) Draw the contour diagram (plot) for $z = f(x, y) = y - x^2$.