## QUIZ 6 - MATH 251 Your NAME:

Read each problem **very carefully** before starting to solve it. Each problem is worth 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Recall that, given the position vector  $\mathbf{r}(t)$  of a moving particle, the tangential and normal components of its acceleration vector are given by  $a_T = \frac{\mathbf{r}'(t)\cdot\mathbf{r}''(t)}{|\mathbf{r}'(t)|}$  and  $a_N = \frac{|\mathbf{r}'(t)\times\mathbf{r}''(t)|}{|\mathbf{r}'(t)|}$ , respectively. Find the acceleration vector and the tangential and normal components of the acceleration vector of a particle whose position vector is  $\mathbf{r}(t) = \frac{1}{t}\mathbf{i} + \ln t\mathbf{j} + t^2\mathbf{k}$  at t = 1.

2. Express in set notation and graph carefully the domain D of the function  $f(x,y) = \frac{\sqrt{4-x^2-y^2}}{\ln(x-y-1)}$ .