EXAM #2 **MATH 271** **FALL 2002**

Federico Tournier Name: _____

SS#: _____

1. Find the point of intersection of the two lines

a)
$$\begin{aligned} x &= 2 & x &= 1+s \\ y &= 3-3t & y &= 4+s \\ z &= -2-2t & z &= -1+s \end{aligned}$$

b) Find the equation of the plane determined by the two lines.

2) Find the distance from the point $(0,1,1)$ to the plane $2x+y+z=4$.

3) Find the parametric equation of the tangent line to the curve

$r(t) = (\sin t, t, e^t)$ at $t=0$

4) Let $r(t) = (t, t^3, t)$ for $t \in [0, 3]$

a) Find the velocity and acceleration vector when $t = 1$.

b) Find the curvature at the point $(1, 1, 1)$.

c) Calculate the normal and tangential components of the acceleration vector at the point $(1, 1, 1)$.

5) A particle moves on the graph of $y = x^4$ from left to right at a constant speed of 2.

a) Find the velocity vector at the point $(1, 1)$.

b) Find the acceleration vector at the point $(1, 1)$.

6) A projectile is fired at an initial speed of 80 feet/sec and aimed at a tangent 100 feet down range (gravity is 32 feet/sec).

a) What are the two possible launching angles?

b) Using the smaller of the above angles, will the projectile clear a wall which is 10 feet high located 70 feet down range? Explain