QUIZ 5 - MATH 251 Friday, February 19

YOUR NAME:_____ George Voutsadakis

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. Provide the conversion formulas:

   From Cartesian to Cylindrical From Cylindrical to Cartesian

   Find an equation of the form $r = f(\theta, z)$ in cylindrical coordinates for the surface $\dfrac{x^2}{yz} = 1$.

2. Provide the conversion formulas:

   From Cartesian to Spherical From Spherical to Cartesian

   Find an equation in spherical coordinates for the surface $z^2 = 3(x^2 + y^2)$.

3. Consider the vector function

$$\boldsymbol{r}(t) = \left\langle \frac{1}{t+1}, \frac{e^t - 1}{t}, 4t \right\rangle.$$

(a) Find the domain $\mathsf{Dom}(\boldsymbol{r}(t))$.

(b) Find $\lim_{t \to 0} \boldsymbol{r}(t)$.

(c) Compute $\boldsymbol{r}'(2)$ and interpret its meaning.