Name:____ **2/15/2017**

Math 392 Linear Algebra and Vector Analysis for Engineers **Quiz 1**

1. Give either a vector function or parametric equations for the tangent line to the curve

$$\vec{r}(t) = \langle 1 + 2\sqrt{t},\ t^3 - t,\ t^3 + t \rangle$$

at the point $(3, 0, 2)$.

2. Let C be the curve of intersection of the parabolic cylinder $x^2 = 2y$ and the surface $3z = xy$. Find the exact length of C from the origin to the point $(6, 18, 36)$.

3. Reparametrize the curve

$$\vec{r}(t) = \langle 2t,\ 1 - 3t,\ 5 + 4t \rangle$$

with respect to arc length measured from the point $(0, 1, 5)$ in the direction of increasing t.

4. Match the following vector fields on $\mathbb{R}^2$ with their plots labeled I-IV.

   (a) $\vec{F} = \langle x,\ 1 \rangle$

   (b) $\vec{F} = \langle 1,\ x \rangle$

   (c) $\vec{F} = \nabla f$, where $f(x, y) = x^2 + y^2$

   (d) $\vec{F} = \left\langle \dfrac{x}{\sqrt{x^2 + y^2}},\ \dfrac{y}{\sqrt{x^2 + y^2}} \right\rangle$