Math 3330 - Quiz 3

Name:_____

1. Find a vector valued function for each of the functions below.
   (a) The line from $(1, 3)$ to $(-2, 1)$.
   (b) The ellipse $\frac{x^2}{4} + \frac{y^2}{7} = 1$.
   (c) The circle of radius 4 centered at the the point $(1, -3)$.
2. Let $\mathbf{r}(t) = \langle 4t, t^2 - 1 \rangle$.
   (a) Graph $\mathbf{r}(t)$.
   (b) Compute the tangent line to $\mathbf{r}(t)$ at the point $t = 3$, and add this tangent line to your graph.
3. Let $\mathbf{r}(t) = \langle e^{-t}\cos(3t), e^{-t}\sin(3t) \rangle$.
   (a) Graph $\mathbf{r}(t)$.
   (b) Compute the tangent line to $\mathbf{r}(t)$ at the point $t = \pi/2$, and add this tangent line to your graph.
   (c) Compute $\lim_{t\to\infty} \mathbf{r}(t)$.
   (d) Compute the arc length $\mathbf{r}(t)$ from $t = 0$ to $t = \infty$.
4. Graph $z = 2x^2 + y^2$. Does this graph represent a function of x and y? Why or why not?
5. Graph $z^2 = x^2 + y^2$. Does this graph represent a function of x and y? Why or why not?
6. Compute all of the first order and second order partial derivatives for $f(x, y) = \sin(3x)+y^3(x^2+2y)-2y$. That is, compute $f_x(x, y)$, $f_y(x, y)$, $f_{xx}(x, y)$, $f_{yy}(x, y)$, $f_{yx}(x, y)$ and $f_{xy}(x, y)$.
7. Compute all of the first order and second order partial derivatives for $f(x, y) = e^{x^2-y^3}$. that is, compute $f_x(x, y)$, $f_y(x, y)$, $f_{xx}(x, y)$, $f_{yy}(x, y)$, $f_yx(x, y)$ and $f_{xy}(x, y)$.