Math 273 | Quiz 5 | Name: _____

19 Feb 2016 | Show appropriate work. | Scaled to 10 points.

1. $\boxed{3}$ Sketch the level curves corresponding to $c = 0, 1, 4$, and 9 for $f(x, y) = (x/2)^2 + y^2$.

2. $\boxed{7}$ Find the limit or show that it does not exist.

   (a) $\displaystyle\lim_{(x,y)\to(1,0)} e^{y^2-x} \arctan\left(\frac{x}{y^2}\right)$

   (b) $\displaystyle\lim_{(x,y)\to(0,0)} \frac{xy}{x^2+y^2}$ [Hint: Consider two paths, lines will do.]

3. Compute the specified partial derivatives.

(a) $\boxed{2}$ $f(x, y, z) = x^2 + \sin(x^2 y + y z^2) + e^{4z}, \quad f_x$

(b) $\boxed{3}$ $f(x, y, z) = \dfrac{x^2 y^3}{z} + \sin\left(\dfrac{y^2 + e^z}{y^2 + z^2 + 1}\right), \quad f_{yzxzy}$

4. $\boxed{5}$ Find an equation for the tangent plane to $f(x, y) = x^2 + \sin x$ at $(1, 0)$.