

Math 53 Quiz 5.5 (Just for Practice)  
March 1, 2017

This quiz is a practice quiz, and will not be graded. For the most authentic experience, set aside 25 minutes to work, and put away all outside resources, as well as devices such as calculators. Please read the instructions carefully, and explain your work.

**Problem 1.** (0 points) Find the linear approximation of the function  $f(x, y) = \ln(1 - (x^2 + y^2))$  at the point  $P = (0, 0)$ .

**Problem 2.** (0 points) The pressure, volume, and temperature of a mole of an ideal gas are related by the equation  $PV = 8.31T$ , where  $P$  is measured in kilopascals,  $V$  in liters, and  $T$  in kelvins. Use differentials to find the approximate change in the pressure if the volume increases from 12 L to 12.5 L and the temperature decreases from 310 K to 300 K.

**Problem 3.** (0 points) Find the second derivative of  $y$  with respect to  $x$  for the curve described by  $e^{x+y} = x - y$ .