Math 250 Quiz 6 Spring 2000

Name: _____ ID #: _____

NO CALCULATORS

1. [20 points] Write down the first 7 nonzero terms of the Taylor series for the fun tions below entered about zero.

   a. e^x

   b. $\sin x$

   . $\cos x$

   d. e^{x^2}

   e. $(\sin x^2)/x$

   f. $\cos^2 x$

2. [20 points] A fun tion $f(x, y)$ is alled *harmonic* if $f_{xx} + f_{yy} = 0$. Whi h of the fun tions below are harmoni ?

a. $f(x, y) = \text{ar tan}(y/x)$

b. $f(x, y) = \ln \sqrt{x^2 + y^2}$

. $f(x, y) = \sin(xy)$

d. $f(x, y) = x^4 y^2$

3. [20 points] Find the volume above the xy-plane, below the plane $2x - y + z = 5$, and within the ylinder $x^2 + y^2 = 1$.
Hint: The answer is 5π.

4. [40 points] Find the volume of the region above the xy-plane but below the surfa e $f(x, y) = 16 - x^2 - 4y^2$. Hints: First sket h the region. The answer is 64π. (It took me three tries. Just do the best you an.)

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