MAT 218 FALL 2008
FEEDBACK ON PROBLEM SET 3

This week most of you did very well in the problem set. I'll just present the solution to two of the exercises.

1. Solution to selected exercises.

Folland 2.7.4: Here's a small trick: the Taylor series of e^{-x^2} is alternating and convergent for each x. Hence for any real number x,

$$1 - x^2 + \frac{x^4}{2!} - \frac{x^6}{3!} + \frac{x^8}{4!} - \frac{x^{10}}{5!} \leq e^{-x^2} \leq 1 - x^2 + \frac{x^4}{2!} - \frac{x^6}{3!} + \frac{x^8}{4!} - \frac{x^{10}}{5!} + \frac{x^{12}}{6!}.$$

Integrating, we get

$$0.7467 \leq \int_0^1 e^{-x^2} dx \leq 0.7469.$$

Hence the answer is 0.747 correct to 3 decimal places.

Spivak 2-18: Let $h(z) = \int_a^z g$. Then $f(x, y) = h(x + y)$. Hence

$$\partial_x f(x, y) = h'(x + y) \frac{\partial}{\partial x}(x + y) = g(x + y).$$

Similarly

$$\partial_y f(x, y) = g(x + y).$$