Problem Set 4   Calculus 2   Due 3/2/09

You are encouraged to work in groups of two to four on this assignment and make a single group submission. Each problem is worth 5 points. For full credit indicate clearly how you reached your answer. All work must be legible and submitted on clean paper without ragged edges.

1. The gamma function is defined as $\Gamma(x) = \int_0^\infty t^{x-1} e^{-t} dt$.

   a) Find G(1), G(2), G(3), G(4), and G(5). Is there a pattern?

   b) Show that G(x + 1) = x G(x) for all x > 0. [Hint: Integration by Parts is your friend.]

2. a) Use *Mathematica* or other technology to find an exact value for G(½).

   b) Explain how, once you have the value from part a for G(½), you can find G(3/2) and G(-½) without needing a computer or calculator again.