

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. Do #3 from the Discovery Project on p. 517 of Stewart.
2. Find the area between the line $y = x$, the right half of the hyperbola $x^2 - y^2 = 1$, and the line $y = 0$, or show that the area is infinite.
3. Define $\Gamma(x) = \int_0^{\infty} t^{x-1} e^{-t} dt$.
 - a) Find $\Gamma(1)$, $\Gamma(2)$, $\Gamma(3)$, $\Gamma(4)$, and $\Gamma(5)$.
 - b) Show that $\Gamma(n + 1) = n \Gamma(n)$.
4. It can be shown in Calc 3 that $\int_0^{\infty} e^{-u^2} du = \frac{\sqrt{\pi}}{2}$. What is $\Gamma(1/2)$?