Math 142 Group Quiz 3

Names: _____

1. For any number n, define $\Gamma(n) = \lim_{t\to\infty} \int_0^t x^{n-1}e^{-x}\,dx$.

a. Find $\Gamma(1)$.

b. Find $\Gamma(4)$.

c. What is $\Gamma(n)$ when n is a positive whole number?

2. Let $s > 0$ be a constant. Find $\lim_{t\to\infty} \int_0^t e^{-sx} \sin x \, dx$.

3 (Bonus!). (Try on a separate page only when all other exercises are correct.) Why does

$$f(x) = (e^x - e^{-x})/2$$

have an inverse $g(x)$? Find the equation for the inverse.