**Math 2B Worksheet: 5.5 Substitution**

*Write your names and Student ID numbers at the top of the page*

1. Make a substitution and then integrate.

   (a) $\int \cos^3\theta \sin\theta \, d\theta$

   (b) $\int \frac{\cos(\ln t)}{t} \, dt$

   (c) $\int_0^1 xe^{-x^2} \, dx$

   (d) $\int_0^4 \frac{x}{\sqrt{1+2x}}, \, dx$

   (e) $\int \frac{2^t}{1+2^t} \, dt$

2. Suppose $h$ is continuous and $\int_1^3 h(s)\,ds = 4$. Find $\int_1^9 \frac{h(\sqrt{t})}{\sqrt{t}}\,dt$.

3. Suppose $g$ and $f$ are continuous functions. Suppose further that $g$ is an *odd function* (i.e. $g(-x) = -g(x)$ for each real number $x$) and that $f$ is an *even function* (i.e. $f(-x) = f(x)$ for each real number $x$). Let $a > 0$ be any positive real number.

   (a) Show that $\int_{-a}^{a} g(x)\,dx = 0$.

   (b) Show that $\int_{-a}^{a} f(x)\,dx = 2\int_0^a f(x)\,dx$.