Math 1a. §5.5 Worksheet
The Substitution Rule

Fall 2005

1. Evaluate each of the following integrals

   (a) $\int (4x+3)^{-3}\,dx$, where $u = 4x+3$.

   (b) $\int e^{\sin x}\cos x\,dx$, where $u = \sin x$.

   (c) $\int x^3\sqrt{9-x^2}\,dx$, where $u = 9-x^2$.

   (d) $\int_0^{\pi} 4\sin^3 x\cos x\,dx$, where $u = \sin x$.

(e) $\displaystyle\int \frac{x+1}{\sqrt[3]{3x^2+6x+5}}\,dx$

(f) $\displaystyle\int \frac{e^x}{e^{2x}+2e^x+1}\,dx$

(g) $\displaystyle\int \sec x \tan x\,dx$

(h) $\displaystyle\int_e^{4e} \frac{dx}{x\sqrt{\ln x}}\,dx$

2. Find real numbers a and b such that the equality

$$\int_1^2 x^2 e^{x^3/4}\,dx = \frac{4}{3}\int_a^b e^u\,du$$

holds.

3. Suppose that $\int_0^{12} g(x)\,dx = \pi$. Evaluate $\int_0^4 g(3x)\,dx$.