

**INTEGRATION, DIFFERENTIAL EQUATIONS AND
APPROXIMATION
HOMEWORK #1**

2007 FALL

Evaluate the indefinite integrals:

5.5.8 $\int x^2(x^3 + 5)^9 dx$

5.5.30 $\int \frac{e^x}{e^x+1} dx$

5.5.56 Evaluate $\int_0^1 x\sqrt{1-x^4} dx$ by making a substitution and interpreting the resulting integral in terms of an area.

5.5.64 If f is continuous on \mathbb{R} , prove that $\int_a^b f(x+c) dx = \int_{a+c}^{b+c} f(x) dx$.

Evaluate the integral:

6.1.18 $\int_1^4 \sqrt{t} \ln t dt$

First make a substitution and then use integration by parts to evaluate the integral:

6.1.26 $\int x^5 \cos(x^3) dx$

Use integration by parts to prove the reduction formula:

6.1.34 $\int x^n e^x dx = x^n e^x - n \int x^{n-1} e^x dx$

6.1.42 If $f(0) = g(0) = 0$ and f'' and g'' are continuous, show that $\int_0^a f(x)g''(x) dx = f(a)g'(a) - f'(a)g(a) + \int_0^a f''(x)g(x) dx$.