Second Monday Math 135 review problems for section F2

Substitution

1. $\int (3x - 6)e^{3x^2 - 12x}\, dx$

2. $\int_0^{\sqrt{\ln 7}} xe^{(x^2)}\, dx$.

Antiderivatives & initial value problems

1. Suppose $f''(x) = x + \frac{1}{x^2}$ and $f(1) = 1$ and $f'(1) = -2$. Find a formula for $f(x)$. Computations with exp and log should be simplified as much as possible; approximations are not acceptable.

2. Suppose $f''(x) = \cos x + \sin(2x)$ and $f(0) = 0$ and $f'(\pi) = 0$. Find a formula for $f(x)$. Computations with sine and cosine should be simplified as much as possible; approximations are not acceptable.

3. Suppose $f''(x) = e^x - 1$ and $f(0) = 2$ and $f'(0) = -3$. Find a formula for $f(x)$. Computations with exp and log should be simplified as much as possible; approximations are not acceptable.

Definite integral

1. Suppose P and Q are constants, and $f(x) = P\sin(7x) + Qx\cos(7x)$. Find specific values of P and Q so that $f'(x) = x\sin(7x)$. Use your answer to evaluate $\int_0^{\pi/7} x\sin(7x)\, dx$.

2. Suppose $f(x) = xe^x - e^x$. Compute $f'(x)$, and use your answer to evaluate $\int_0^1 xe^x\, dx$ exactly.