The problems on this worksheet are for in-class practice during tutorial. You are free to collaborate and to ask for help. They don't count for course credit, but it's a good idea to make sure you know how to do everything before you leave tutorial – similar problems may show up on a test or assignment.

This week I've tried to make my best guess at what your test on Friday might look like.

1. Evaluate the following "immediate integrals":

   (a) $\int (2x+3)^4\,dx =$

   (b) $\int \dfrac{x^2+2x}{x^3+3x^2+5}\,dx =$

   (c) $\int \tan^5(x)\sec^2(x)\,dx =$

   (d) $\int \dfrac{\ln(\sqrt{x+1})}{\sqrt{x+1}}\,dx =$

   (e) $\int \dfrac{1}{\sqrt{4-x^2}}\,dx =$

   (f) $\int \dfrac{x^3-4x^2}{\sqrt{x}}\,dx =$

   (g) $\int \dfrac{e^x+1}{e^x}\,dx =$

   (h) $\int \dfrac{\ln(x^3)}{x}\,dx =$
   (Hint: log laws)

   (i) $\int x(1-x^2)^5\,dx =$

   (j) $\int 3x^2\cos(x^3)e^{\sin(x^3)}\,dx =$

2. Evaluate the following integrals:

(a) $\int x \sec^2(x)\, dx$

(b) $\int e^{\sqrt{x}}\, dx$

(c) $\int \cos(x)\cos(2x)\, dx$

(d) $\int \tan^5(x)\sec^4(x)\, dx$

(e) $\displaystyle\int \frac{8}{\sqrt{x^2+2}}\,dx$

(f) $\displaystyle\int \frac{\sqrt{5-x^2}}{x^2}\,dx$

(g) $\displaystyle\int \frac{16x^2-2x}{(x+3)(2x-1)(x-1)}\,dx$

(h) $\displaystyle\int \frac{2x+1}{x^3+x}\,dx$

These won't be on your test, but I thought I should give you a couple of practice problems involving improper integrals.

3. Evaluate the following improper integrals, or explain why they do not exist:

   (a) $\displaystyle\int_0^4 \frac{1}{\sqrt{x}}\,dx$

   (b) $\displaystyle\int_1^\infty \frac{\ln(x)}{x^2}\,dx$