My Office Hours: M & W 2:30–4:00, Tu 2:00–3:30, & F 1:30–2:30 or by appointment. **Math Intern:** Sun: 2:00–5:00, 7:00–10pm; Mon thru Thu: 3:00–5:30 and 7:00–10:30pm in Lansing 310. Website: `http://math.hws.edu/~mitchell/Math131F15/index.html`.

☞ *Practice*

Reread 7.4 and Handout on triangle substitution. Unless you do **lots of practice** before and after every class, this material will rapidly become very confusing. Do not fall behind!

☞**Test next Thursday in Lab.** Volume, Work, Arc Length, Integration by Parts, Integration of Powers of Trig Functions, Integration Using Triangles. I will organize practice problems over the weekend. In the mean time, try these:

1. Integral Mix Up: Before working these out, go through and classify each by the technique that you think will apply: substitution, parts, parts twice, trig methods, or ordinary methods. Answers on the back.

   (a) $\displaystyle\int xe^{2x}\,dx$ (b) $\displaystyle\int xe^{x^2+1}\,dx$ (c) $\displaystyle\int e^x \cos x\,dx$

   (d) $\displaystyle\int x^2 \sin x\,dx$ (e) $\displaystyle\int \cos^3(2x)\,dx$ (f) $\displaystyle\int x\cos(x^2)\,dx$ (g) $\displaystyle\int \frac{(\ln x)^2}{x}\,dx$

   (h) $\displaystyle\int \ln(x^2)\,dx$ (i) $\displaystyle\int \ln\sqrt{x}\,dx$ (j) $\displaystyle\int x^2 \ln x\,dx$ (k) $\displaystyle\int \cos^2(12x)\,dx$

   (l) $\displaystyle\int \tan x\,dx$ (m) $\displaystyle\int \arctan x\,dx$ (n) $\displaystyle\int \sin^2 x \cos^3 x\,dx$ (o) $\displaystyle\int \sin(5x)\cos(2x)\,dx$

☞*Hand In:*

0. WeBWorK Day 23 (Due Tuesday night)

1. Page 529 #22 (Should be able to do it without looking at guidelines.)

2. Page 530 #32 (Read the Guidelines)

3. $\displaystyle\int \cos^2\left(\frac{x}{3}\right)\,dx$

4. $\displaystyle\int \cos^4(3x)\,dx$

5. $\displaystyle\int \frac{x^2}{\sqrt{25-x^2}}\,dx$. (Hint: Use the double angle formula from the last page of the handout to simplify the final answer.) This is a WeBWorK Day 23 problem.

6. $\displaystyle\int \frac{x^3}{\sqrt{1-x^2}}\,dx$. This is a WeBWorK Day 23 problem.

7. Then finish with this nice problem: $\displaystyle\int x\cos^2 x\,dx$. Hint: First use a half-angle identity. This is a WeBWorK Day 23 problem.

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1. Some Answers to the Mix-Up Problem: (All "$+c$".)

(a) $\frac{1}{2}xe^{2x} - \frac{1}{4}e^{2x}$

(b) $\frac{1}{2}e^{x^2+1}$

(c) $\frac{1}{2}e^x \cos(x) + \frac{1}{2}e^x \sin(x)$

(d) $-x^2 \cos x + 2\cos x + 2x \sin x$

(e) $\frac{1}{2}\sin(2x) - \frac{1}{6}\sin^3(2x)$

(f) $\frac{1}{2}\sin(x^2)$

(g) $\dfrac{(\ln x)^3}{3}$

(h) $2x \ln(x) - 2x$

(i) $\frac{1}{2}x \ln(x) - \frac{1}{2}x$

(j) $\frac{1}{3}x^3 \left(\ln x - \frac{1}{3}\right)$

(k) $\frac{1}{2}x + \frac{1}{48}\sin(24x)$

(l) $\ln|\sec x|$

(m) $\arctan x - \frac{1}{2}\ln(1+x^2)$

(n) $\frac{1}{3}\sin^3 x - \frac{1}{5}\sin^5 x$

(o) $-\frac{1}{6}\cos(3x) - \frac{1}{14}\cos(7x)$