CALCULUS HOMEWORK EXPECTATIONS

Homework will be assigned daily and "due" the next class. You are expected to do all of the problems listed and be prepared to ask questions at time it is due as that will be the only time devoted to answering questions from that section. If you get behind on the homework, it will have a very negative effect on your grade.

When doing your homework, you are expected to take the time to read the corresponding sections carefully. Reading a math textbook properly takes time. You are expected to go through each of the book's examples step-by-step. After reading the text and reviewing the class notes, you should attempt to work the problems. Check your answers to all the odd problems to make sure you are doing them correctly. For any problems that you get wrong, try them again. Don't give up easily, many problems require a few tries. Overcoming challenge is how we grow. Don't immediately look at the solution manual (or Slader or whatever) Look back in the notes or the example problems to see if there is a similar problem. Try SOMETHING. If after trying the problem a couple of times you still can't do it, YOU SHOULD CIRCLE IT then ask about it in class. Have all your questions organized before coming to class.

Your homework should be neat and thorough with explanations and notes in your own words. If you make a mistake, don't erase. Instead, learn from it. Make a note as to your understanding. If you just copy my solutions or the solution, you will not gain the benefit of having figured it out yourself.

<u>What you will turn in:</u> See sample below.

You will turn in highlighted problems from each section. These must be turned in as you walk into class, before we go over homework.

Your name and homework section should be at the top of the page.

In each section, there are a few (2-5) highlighted problems which you are expected to formally write up. Because there are only a few problems turned in, I expect them to be very neat and thorough with explanations. The goal is to create a tool for studying for the exam. (Note however, these problems do not adequately represent the entire section. Limiting your study to only these problems is not adequate.) I would suggest you do this part *after* you have done the homework for the sections since you will be better able to summarize key points.

Each section will be worth 5 HW points:
Neatness/Explanation: 1 point
Attempt all problems: 3 points
Problem Accuracy: 1 point

Kathleen Hogue
7.1: 5, 27, 38

7.1 Integration by Parts

$\int u\,dv = uv - \int v\,du$ — Need to choose "u" and "dv" so that new integral is easier

Useful when integrating product like $x\cos x$, $e^x \sin x$, $x \ln x$
Also use for integrating $\ln x$ and inverse trig etc.

* remember "dt's"

5) $\int te^{-3t}\,dt$ $\quad u = t \quad dv = e^{-3t}dt$ $\quad du = dt \quad v = \int e^{-3t}dt = -\frac{1}{3}e^{-3t}$

$= -\frac{1}{3}te^{-3t} - \int -\frac{1}{3}e^{-3t}dt$

$= \boxed{-\frac{1}{3}te^{-3t} - \frac{1}{9}e^{-3t} + C}$

27) $\int_1^3 r^3 \ln r\,dr$ $\quad u = \ln r \quad dv = r^3\,dr$ $\quad du = \frac{1}{r}dr \quad v = \frac{1}{4}r^4$

Usually with integration by parts, if there is a ln, try letting it be u.

$\frac{1}{4}r^4 \ln r \Big]_1^3 - \int_1^3 \frac{1}{4}r^3 dr$

$\frac{1}{4}r^4 \ln r - \frac{1}{16}r^4 \Big]_1^3$

$\frac{81}{4}\ln 3 - \frac{81}{16} + \frac{1}{16}$

$\boxed{\frac{81}{4}\ln 3 - \frac{80}{16}} = \boxed{\frac{81}{4}\ln 3 - 5}$

38) $\int t^3 e^{-t^2}\,dt$

Tried $u = t^3 \quad dv = e^{-t^2}$ $\quad du = 3t^2 dt \quad v = ???$

$u = e^{-t^2} \quad dv = t^3 dt$ $\quad du = -2te^{-t^2} \quad v = \frac{t^4}{4}$ ↓ got worse

Try a u-substitution first

$u = -t^2$
$du = -2t\,dt$

Sometimes combine with u-sub

$\int t^3 e^u \frac{du}{-2t}$

$t^2 = -u$

$-\frac{1}{2}\int t^2 e^u\,du$

$\frac{1}{2}\int ue^u\,du$ $\quad u_1 = u \quad dv = e^u du$ $\quad du_1 = du \quad v = e^u$

$\frac{1}{2}\left[ue^u - \int e^u du\right] = \frac{1}{2}ue^u - \frac{1}{2}e^u + C$

$= \boxed{\frac{1}{2}t^2 e^{-t^2} - \frac{1}{2}e^{-t^2} + C}$

Also remember
- by parts more than once #19
- problems that go in circles #17
- inverse trig #10