PROBLEM SET #7:
PLEASE: Staple your answers!
The suggested problems (from the book) are ones that you should look and
make sure you know how to do them. These are not problems to be handed in.

NOTE about the SECOND EXAM:
It will be an in-class exam (OPEN BOOK/OPEN NOTES) on Friday Nov. 12.
Further details will appear here later on.

PROBLEMS FROM THE BOOK:
Sec. 5.4: 4 10 (10 is hard).
Suggested: 7 9 11
Sec. 5.5: 2 5 6
Suggested: 3 4 7a 7d 10 (10 is hard).

OTHER PROBLEMS
7.1) Find a formula for:

$f(x) = \text{Sum\_}\{n=1\}^{\{n=\text{infinity}\}} ((-1)^n)(\sin(n*x)/n)$,

where x is real, -pi <= x <= pi.

Write a short program to calculate and plot the sum of the series.
In MatLab you could define an array of values in -pi <= x <= pi by:

x = -pi + 2*pi*(0:750)/750;

Then do a loop to sum (say) the first 3000 terms:

```
f = 0;
for n=3000:-1:1
f = f + ((-1)^n)*sin(n*x)/n;
end
```

and then plot(x, f).

Look at the plot. Can you get this from your formula?

Note: this series converges rather slowly (this is why I suggest a lot
of terms in the summation). This series is also a good example of
a NONUNIFORMLY convergent series of functions. At any given x, the error
after summing N terms is less than C(x)/N, but C(x) is not bounded.

THE STUFF BELOW IS HIGHLY RECOMMENDED; DO IT (although we will
not gradeit, since it is an open-ended thing, what happens here is very

important and it will show up later in the course).

To see how the convergence actually occurs, try plotting partial sums
(as above), but instead of looking at a lot of terms, look at what
happens as you add (say) 10, 20, 50, 100, 150 terms. LOOK carefully at
what goes on near x = pi and x = -pi. Do now the same for the series
where the n-th term is sin(n*x)/n and look now at what happens near x=0.