Phys234, 2018, Problem set #3: Due Monday February 12, 3pm

Question 1, 2: will be given at the start of the lab.

Question 3:

The function m-file `sinser.m` (which I have used in class, available on eclass) evaluates the series representation of $\sin(x)$ at a given value of x for a user-defined relative tolerance. Using `sinser.m` as a starting point, modify this function to create a function m-file
`function ssum = log1px(x,tol,nmax)`, to evaluate the series representation of $\ln(1+x)$ given by

$$\ln(1+x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + ...$$

Write a function file `ps3q3` that tests your function `log1px` for the following 3 cases:

```
rtol=5e-9;
s1=log1px(5e-9,rtol)
s2=log1px(0.1,rtol)
s3=log1px(0.9,rtol)
```

Question 4:

The function m-file `demoTaylor.m` (which I have used in class, available on eclass) evaluates the Taylor series approximation of $f(x) = 1/(1-x)$ expanded about a given value of x. As an output, it shows graphically a comparison between the true function, and the Taylor series approximation when the series is truncated after the first, second and third term. Using `demoTaylor.m` as a starting point, write a function m-file `function demoTaylorlog(x0,dx)`, that does the equivalent but for the Taylor series representation of $f(x) = \ln(x)$. Write a function file `ps3q4` that calls your function `demoTaylorlog` with

```
x0=0.9; dx=1.6;
demoTaylorlog(x0,dx)
```