The .pdf attached to your assignment – NewtonRaphsonMethodRootFinding.pdf – describes the "Newton-Raphson" method of finding a root of an equation. (At some points in the document, Newton-Raphson is contrasted with another method called the 'Bisection Method' – don't worry about the latter method.)

The purpose of this assignment is to write a MATLAB function that executes the Newton-Raphson method, using the flowchart on the third page as help (but see below!)

1. Write a root finder that inputs an 'initial guess' and an 'accuracy' to which you would like the root solved.
2. Rewrite a good-engineering-computing pseudocode, using the flowchart on the third page, BUT using a **`while`** loop as the main iteration. (Hint: you won't start where the flowchart says "Start.") (Another hint: when do you want the while loop to stop? As soon as you have achieved the accuracy entered in.)
3. Use **subfunctions** to calculate f(x) and f'(x)
    a. In particular, do not use any MATLAB '**`symbolic`**' functions to calculate derivatives. That is, you will not be using something not covered in this class, like '**`syms`**' or '**`diff`**'. When you write the derivative subfunction, you will take a derivative with pencil and paper, and then plug that expression directly into the subfunction.
4. On every iteration, display the current x value, y value, and current root guess (corresponding to x_i, y, and x_n in the handout)
5. Using steps 1-4, find a root of equation 6.20, with an initial guess of 10 and an accuracy of 1e-10. Your output should match values from Table 6.2.
6. Using steps 1-4, find a root of $y = \ln(x) - x + 3$ with an initial guess of 10 and an accuracy of 1e-10. Note that you will have to change your subfunctions! (That is, with new analytical expressions.) Your output should look like this:

```
>> find_root(10,1e-10);
Iteration 1:     x_i = 10.0000    f(x_i) = -4.6974      x_n = 4.7807
Iteration 2:     x_i = 4.7807     f(x_i) = -0.2161      x_n = 4.5074
Iteration 3:     x_i = 4.5074     f(x_i) = -0.0017      x_n = 4.5052
Iteration 4:     x_i = 4.5052     f(x_i) = -0.0000      x_n = 4.5052
found_root = 4.5052
```

(Hint: to line up things nicely in **`fprintf`** or **`sprintf`**, use the \t delimiter as a 'tab' character)

As always, turn in a good report including pseudocode, code (you can turn in one .m file, parts 5 and 6 could be different commented/uncommented lines for the specific functions/subfunctions), and a diary of your input/output.