Math 206 Project 1 **Due 15 July 2012 at 11:59pm**

What to Submit:

For this project you will need to create and submit a single script m-file called `project1.m`. This file should do all of the things requested in the problems below in the order specified.

Grading Method:

For grading we will run this m-file through Matlab.

If there are any unexpected errors then the project will automatically earn a grade of 0 so make sure you run your m-file through Matlab and check the output before submitting! Be very careful about making sure that any necessary symbolic variables are defined in your code. The assumption should be that we will run your m-file through a clear matlab process. Assuming your script m-file goes through we will grade each question as correct or incorrect based upon its output. Point values are specified, remaining point values are for details like the file name and using a single Matlab entry where requested.

You do not need to number the problems in any way, just be sure to include them in your m-file in the order they are listed below.

The phrase *single Matlab entry* means a Matlab command or compound command on a single line with no semicolons separating commands. For example the first of the following is acceptable while the second is not, even though both do the same thing.

Acceptable: `log(asind(0.5))`

Unacceptable: `asind(0.5);log(ans)`

The point of asking for answers like this is to make sure you are able to construct useful compound commands. Any question which does not request a single Matlab entry can be done on as many lines as you wish.

The Problems:

Each of the following should be done with a *single Matlab entry.*

1. Clear out Matlab. [2 pt]
2. Get help on the `atand` command using `help`. [4 pt]
3. Declare all symbolic variables you will need for the project. [4 pt]
4. Find the approximate cosine of $2\pi/9$. [4 pt]
5. Find the resulting approximate population when an initial population of 5000 grows at a continuously compounded yearly growth rate of 3.2% for ten years. [4 pt]
6. Simplify the expression $\frac{x}{2-\frac{1}{x+1}}$. [4 pt]
7. If a right triangle has legs of length 3 and 5 find the approximate degree measurement of the angle opposite from the leg of length 5 using the `atand` command. [6 pt]
8. Factor the polynomial $10x^6 - 71x^5 + 159x^4 - 117x^3 + 27x^2$. [4 pt]
9. Do the following with one Matlab entry per command: [6 pt]
   (a) Assign z to be equal to the year you were born.
   (b) Assign z to be $z/2$.
   (c) Assign z to be $\log_2(z)$.
10. Solve the equation $x^3 - 3x^2 = x - 3$ using `solve`. [4 pt]
11. Solve the equation $x + \frac{1}{y+z} = z$ for y using `solve`. [6 pt]
12. Use `solve` to solve the equation whose solution is the time required for an object to strike the ground if it is shot directly upwards from an altitude of 200 feet at an initial velocity of 70 feet per second. [10 pt]
13. Solve (approximately) the equation $\ln(x) + \ln(x-2) = 10$ using `solve`. [4 pt]
14. Solve the system of equations, assigning the solution to the vector $[X\ Y]$. [6 pt]

$$5X - 3Y = 323$$
$$1.5X + Y = 57$$

15. Two numbers add to yield 100 and multiply to yield 60. Solve a system of equations to find the numbers. Use variable names of your choice. [6 pt]
16. Use `fzero` to approximate a root of $f(x) = \cos(x + \sqrt{x})$ near $x = 8$. [4 pt]
17. Use `fzero` with a polynomial to approximate the cube root of 10. [8 pt]
    Hint: What equation is this value a solution to?
18. Use some graphing tool (calculator, Wolfram Alpha, etc.) to find the integer closest to the *second smallest positive x-intercept* of $f(x) = \frac{\sin x}{x}$. and then use `fzero` to approximate this root using that integer as the initial guess. You do not need to explain how you got your initial guess. [8 pt]