MATH 5346-02 Lab Assignment 1: Getting going

1. Introduction to Matlab
   a. >> command prompt
   b. Quit Matlab with the command quit or exit
   c. Commands are only executed when you press Enter
   d. The line with the >> prompt is called the command line
   e. you can type >> help text to ask for on-line help
   f. Matlab has most of the usual mathematical functions that you will find on your calculator: sin, cos, log (the natural logarithm), log10, exp, sqrt etc and some common constants like pi (π).

2. Basic arithmetic
   For example, type 2 + 3 after the >> prompt, followed by Enter returns 5 and >> 2 - 5 < Enter > produces -3.
   Practice: compute \( \frac{2 \times 5^4 + 9}{\sqrt{4}} \), i.e. Write down the Matlab command syntax and obtain the answers.
   >> ______________. Answer: ______________
   also try format long: ______________.

3. Basic algebra
   To assign a value to a variable, type a = 2 to assign the value of 2 to a. Then the answer for >> a + 10 < Enter > will be 12. (Note: try a = 2; the semi-colon prevents the value of a from being displayed).
   Practice: Give values to variables a and b on the command line, e.g. \( a = \ln(3) \) and \( b = \exp(5) \). Write some statements of finding
   a. the sum >> ______________ Answer ______________,
   b. the difference >> ______________, Answer ______________,
   c. the product >> ______________, Answer ______________, and
   d. the quotient >> ______________, Answer ______________ of a and b.

4. Initializing vector: the colon operator
   Variables such as a and b above are called scalars; they are single-valued. Matlab also handles vectors. A vector is a special type of matrix, having only one rows or columns. A vector can be generated with the colon operator. For example, enter the statement: \( x = 1 : 10 \), we will obtain the integers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.
   Practice: What would Matlab display in response to following statements?
   >> \( x = 1 : 0.5 : 4 \) ______________.
   >> \( x = 0 : -2 : -10 \) ______________.
5. Practice: this problem is concerned with graphing \( x(t) = \cos \frac{2\pi}{3} t \) using Matlab command \( \text{plot}(t, x) \).

   a. the period of \( x \) is 3, thus to obtain 2 periods, a vector \( t \) with 61 data points should be _________ and for 601 data points _________.

   b. define the variable \( x \) using Matlab syntax: >> _________. (Note: in matlab, the trigometric functions like \( \sin(x) \) expect the argument \( x \) to be in radians.)

   c. use the command \( \text{plot}(t, x) \) to obtain a graph. Then draw a sketch of the graph you obtained below.

6. Practice: the objective of this problem is to graph the transient function \( x(t) = e^{-0.2t} \sin(t) \) over the domain 0 to 6\( \pi \) using the .\* dot operation.

   a. build the vector \( t \) with 121 data points _____________.

   b. define the variable \( x \) using Matlab syntax: >> ____________ using .*,

   c. graph the function using \( \text{plot}(t, x) \) statement and draw a copy of the plot below.