**MATLAB For Scientists**

**HW1**

**Instructions**

Answer the questions below in a single script. Submit the script titled HW1\_ studentID\_script.m, to Canvas, by 11:59p EST on the date provided on the Syllabus. Separate each question with double percent signs and rewrite the main question prompt in a block of comments as shown below. Then, use comments to designate question sub-parts. For example:

**%% Question 1**

% Write the MATLAB command that performs the following operations. Store each

% output in a variable with the name of your choice. Display the answer using

% disp and the variable name according to the instructions above.

% Q1 part a:

% Q1 part b:

Ensure each question follows the guidelines below:

* **The display answer to every question should begin with the question # and part.** Ex: for Q1 part a, disp(“Question 1a: “ + …) (-0.5 pts each).
* When specified, the answer should be displayed in **a grammatically correct complete sentence**, including spaces where appropriate, and punctuation marks (-0.5 pts each).
* Suppress **all** intermediate outputs. Only the answers should display on the command line (-0.5 pts each).
* No hard coding beyond the minimal necessary (-0.5 pts each).

**Problems**

**Question 1 (2 pt):**

Use MATLAB to answer the following questions:

1. Define a variable called var11 and set it equal to the sum of 5 and 3. Display the value of var11 using the syntax described above.
2. Define a variable called var12 and set it equal to the subtraction of 3 from 10. Display the value of var12 using the syntax described above.
3. Define a variable called var13 and set it equal to the multiplication of 5 and -3. Display the value of var13 using the syntax described above.
4. Define a variable called var14 and set it equal to 10 raised to the power of 3. Display the value of var14 using the syntax described above.

**Question 2 (2 pt):**

Use MATLAB to answer the following questions. Store each output in a variable with the name of your choice. Display the value of the variable using the syntax described above:

1. Calculate the square root of 5
2. Calculate the natural base e raised to the 3rd power
3. Round 10.4 to 10 using two different MATLAB functions. Display both as Question 2c method 1 or Question 2C method 2.
4. Round the sin of 46 to the lowest nearest integer

**Question 3 (2 pt):**

Use the help or doc functions on the command line to investigate the format function. Determine the correct option of format that will display the output of 5/16 + 2/7 as 67/112 instead of its decimal equivalent. Store the MATLAB command that will achieve this in a string with variable name of your choice, and display the string using disp. Ensure that your string includes “Question 3:” at the beginning. For example, if my format was short fixed decimal, I would display “Question 3: format short”.

**Question 4 (2 pt):**

A horse weighs on average 1000 lbs. Use MATLAB to do the following:

1. Create a variable called horsePounds and store the horse’s weight in pounds. Display the horses weight in pounds using a complete sentence (note that complete sentences should include units).
2. Convert this weight to kilos using the conversion factor 1kg = 2.2 lbs, and store a new variable called horseKilos with the converted horse weight in kg. Display the horses weight in kilos using a complete sentence (note that complete sentences should include units).

**Question 5 (2 pt):**

The molecular formula for starch is C6 H10 O5. We can assume the molecular weight of carbon is 12.011 g/mol, oxygen is 15.99 g/mol, and hydrogen is 1.008 g/mol. Store the molecular weights for each element in three separate variables, and use these variables to calculate the overall molar mass. Display the overall molar mass in a complete sentence (note that a complete sentence should include units).

**Question 6 (2 pt):**

Choose any temperature in Fahrenheit (F), and store this temperature in the variable called ftemp. Convert ftemp to degrees Celsius and store the output is stored in a variable called ctemp. Display in a complete sentence the original and converted temperature values. The conversion factor is subtracting 32 from F, and multiplying this value by 5/9.

**Question 7 (2 pt):**

Define two variables that each store the number 10; the first should store it as a numeric variable of class ‘double’, and the second as a string variable type of class ‘string’. In the display for this question, simply write: disp(“Question 7: see line #’s...”), where the sentence is completed with line numbers in your script that the grader should refer to.

**Question 8 (2 pt):**

Write an algorithm that does the following, making sure to suppress all outputs except the last one:

Step 1: Stores the number 10 as a numeric variable

Step 2: Increments this number in steps of 2 by storing a new variable at each step, until the value 16 is reached

Step 3: Displays the final value in a complete sentence

**Question 9 (0 pt):**

What are you most excited to learn from this class? What are you most nervous about this class? Is there anything else you'd like me to know about you? Leave as comments in your script. I will remove your answers **before** your grader receives the homework.