

Name \_\_\_\_\_ Section \_\_\_\_\_

Practice for Exam1 . **READ FULLY FIRST 2 MINUTES. SUBMIT SCRIPT BY END OF CLASS +7 minutes. TURN IN COVER SHEET.**

**NO QUESTIONS RELATED TO MATLAB OR MATH ANSWERED DURING EXAM. DO YOUR BEST. USE LOGIC.**

**SAVE OFTEN.**

**ASK ONLY QUESTIONS RELATED TO HARDWARE ISSUES, PLEASE RAISE YOUR HAND A.S.A.P. THEN!**

Using the 7 steps, develop a re-usable program that solves the problem below while following the requirements of the client.

Calculate the drag (in Newtons) of a model airplane at a specific given velocity (in meters per seconds). The program shall calculate the exact value as well as show the solution graphically using the drag vs. velocity curve, which is defined by a formula you will soon know by heart:

$$Drag(V) = C_d \frac{\rho V^2 A}{2}$$

where the drag coefficient  $C_d = 2.0019 \times 10^{-7}$  (unit-less), the area  $A = 1m^2$ , and the air density  $\rho$  (pronounced “rho”)  $\rho = 1 \times 10^{-6} kg/m^3$ . The velocity  $V$  is in meters per seconds.

Step1:

Step2:

Step3:

Step4: None at this time.

Step5/6:

Step7 a,b,c. Complete ALL steps within the script files. The algorithm should be the comments.

Requirements:

1. The program shall prompt the user what velocity (10- 100m/s) s/he wants to study the drag at, and calculate the drag at that instant. The solution should be displayed in a professionally formatted sentence with 3 decimals.
2. The program shall also study the drag from 0 to 100 m/s in order to plot the curve drag vs. velocity defined by that function. It shall also plot a vertical line representing the velocity the user entered. The two curves should intersect so that the numerical value calculated in 1 above can be confirmed graphically. Title and label the plot properly, include markers.

**Rubric. Please check all these before turning work in.**

Step1	5pts
Step2	5
Step3	5
Step5	10
Step6	3
Step7	
Introduction	5
Clean up commands	3
Variable names	5
Spacing of the code	5
7a. ALGORITHM	5
Define given values	5
Correct prompt	7
Correct numerical solution	5
Correct formatted sentence	5
Define vectors to plot	10
Plot, markers	5
Title, Labels	5
7c. Testing	5

Other 2pts (used for leeway, or unforeseen random errors I don't even want to dream of..)