HW 1c

Vended Cola Problem:

When purchasing a canned cola product from a vending machine, one should leave the can unopened for a short period of time before opening the can. Failing to do so can lead to a very messy "spewing" of the contents.

In order to "scientifically" approach this problem, the following "thought experiment" is conducted:

Three identical refrigerated cans of cola (labeled A, B, and C) are obtained. They are subjected to the following treatments.

- Cans A and C are simultaneously vigorously shaken for 30 seconds. Can B is not shaken and is allowed to sit on a desktop.
- Can A is opened immediately following shaking and (as expected) spews.
- Can B is opened at the same time as Can A and (as expected) does not spew.
- Can C is allowed to sit on a desktop for 2 minutes and is then opened and does not spew.

We recognize that the production of bubbles is an important aspect of this problem. Using the following information, prepare the graphs requested (using Excel):

Weight of unopened can of coke:	381.62 g	
Weight of empty can	14.195 g	
Weight of can "filled" with water	385.52 g	
Weight of 100 ml volumetric flask w/stopper	673.12 g	
Weight of 100 ml volumetric flask filled with water^{+} and stoppered		780.351 g
Weight of 100 ml volumetric flask filled with coke^{++} and stoppered		784.978 g

+distilled, deionized
++ degassed, assumes negligible mass of CO_2

(a) Determine the volume of gas in an unopened can of Coke (free space)
(b) Prepare a graph of number of bubbles vs bubble diameter^{+++}
(c) Prepare a graph of surface area of bubbles vs bubble diameter^{+++}
(d) Prepare a graph of distance between bubbles^{++++} vs bubble diameter^{+++}
(e) Prepare a graph of "volume cleared of bubbles" (after sitting 2 minutes) vs bubble diameter^{+++}

+++ monodisperse
++++ closest neighbor