Welcome to the AP Physics 1 class. I am happy that you decided to take the leap in beginning your formal study of matter and energy called physics. You are not alone in this endeavor - you have your fellow students and your teacher to help you. Your textbook, College Physics by Etknia, Gentile, and Van Heuvelen, is the the product of 30 years of physics education research. Your teacher has taken workshops led by Dr. Etknia who is a Professor of Physics at Rutgers University. This course is best understood by building models and testing hypotheses, not by memorizing equations or solutions to problems. We start from your intuitive understanding of a phenomenon and build from there. We illustrate our models with words, graphs, equations, and graphical representations which are the product of physics education research.

The AP Exam that you hopefully will take in May is not administered online. So, graphs are made on paper by hand. It's really important that you develop proficiency with this task.

The first reading, Experimental Design and Graphical Analysis of Data, discusses how to set up an experiment, what you keep constant, what you vary, and what you measure. Understand the meaning of an independent and dependent variable(s). Understand that uncertainty crops up in any experimental design(Experimental Uncertainty Document). For example, if you are the consulting physicist on a movie set that is predicting where 2 cars will collide in a T intersection, the producer needs the physicist to provide a collision window, not a single point, so the producer can determine where to set up the cameras to capture the shot they want.

An extremely important part of the course is linear fitting experimental data. This seems contradictory. Why would one take experimental data which is not linear and convert it into something which is linear. The answer is that the statistics for a straight line - slope, correlation, mean square are well known and easy to compute. So check out pg 13 in the Experimental Design and Graphical Analysis. These fits are very useful. Please read for understanding this entire document. For example, if you are graphing data from an experiment that looks like an upward opening parabola, then when you graph x^2 on the independent axis and the dependent variable y on the vertical axis, and the graph appears linear, then you have great confidence that your actual data is quadratic. If you are able to successfully fit your data to a straight line, the slope of that line is very meaningful, not only its value, but also its units like meter/second.

When we convene in the fall, we will practice fitting data, finding the slope and its units. These techniques are something we will use throughout the course. These documents can't be digested in one reading. I have reread them many times myself.

To practice with proportionality in general, try the exercises in the following two documents: ProportionalReasoningWalk and ProportionalityWrap

If you would like to converse before September, please email me at mpustie@wdeptford.k12.nj.us

Sincerely,
Mr. Pustie