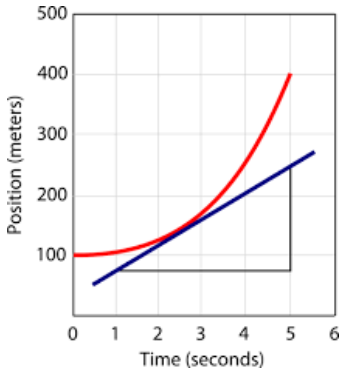
THE DERIVATIVE
Rates of Change and **Motion**



As we continue to study calculus you will be introduced to some of the many uses of the derivative. For now, we will take a quick break from learning *derivation techniques* and look at one of the simplest and most common uses of the derivative – Calculating RATES OF CHANGE.

Hopefully this application will help you understand why computing the derivative of a function is helpful in science.

When we talk about "rates of change" we are talking about looking at quantity that ***changes with respect*** to another quantity. This happens all the time in our physical world:

Examples:

- The speed of and object changes over time
- Temperature changes over time
- The size of a force changed over time

- The density of air changes with increased altitude
- The movement of an airplane wing changes *with respect to* it's distance away from the body of a plane
- The price of oil changes *with respect to* the amount of conflict in the middle east

These are just some of the thousands of examples of ***rates of change*** that occur in our physical world.

One of the simplest sets functions that represent a rates of change (and the most recognizable by a grade 12 student) **are functions that represent motion.**

Workbook. Pg. 214 Ex. 1#1,2,3,4,5,6 Ex.2 #1,2,3,4,6 Ex.3#2, You *can* graph or use a calculator if you wish).

Now time to **practice** your derivatives techniques before we move on, do if you have time and have not already completed the following
(So much to know!...we need to be SOLID on the basics.)

Workbook:
Pg. 144 Ex2 # 2,3,6 Ex3 #1,2,4,5 Ex4 #1 Ex5 # 3, 4,10,12,
Pg. 166 Ex1 #1,3,8,10,12,13,17
Pg 169 Ex2 #1
Pg. 172 # 1,2,3,5,7,9,10,13,14