**Distance, Speed and Acceleration Notes**

NON-UNIFORM MOTION

- Uniform motion means that an object is travelling at the same speed
- non-uniform motion means that the object's speed is changing and that it is accelerating.
    - **Acceleration** (a) is the rate of change in speed.
        - Acceleration is positive if you are *speeding up*
        - Acceleration is negative if you are *slowing down*
    - So, acceleration is a change in speed over a certain time.
- There is often an initial and final speed given so the **average acceleration** can be calculated:
    - $a_{av} = \frac{\Delta v}{\Delta t} = \frac{v_f - v_i}{t_f - t_i} = \frac{v_f - v_i}{t}$
- Acceleration will result in the units of speed (km/h, m/s, etc) divided by the units of time (h, s, etc.). This leaves you with a distance measurement per time measurement *squared*. *E.g.*, 10 km/h$^2$.
    - Note that your time units must match the time within your speed units. *E.g.*, s and m/s
- **Constant acceleration**, also called **uniform acceleration**, shows the same change in speed occurring in each equal interval of time.

SPEED – TIME GRAPHS

- When creating a **speed-time graph**, time is always the independent variable (x-axis) and speed is always the dependent variable (y-axis).
- Just as speed can be calculated from a distance-time graph by finding the slope, acceleration can be calculated from a speed-time graph in the same fashion.
    - The average acceleration is the slope of the line of best-fit.
    - Calculating the area under the line will equal the distance traveled during that particular time.