**Sinusoidal**:

1. Alternating current is named such as the direction of current is constantly changing, thus when measured with a voltmeter, the voltage is constantly alternating, beginning at positive transitioning to negative and back up to positive. The rate at which the change happens is expressed in hertz(hz) where one hertz is equivalent to one cycle per second this is called the utility frequency. Voltage readings are often expressed using functions called AC waveforms in which voltage is placed on the y-axis and the time is placed on the x-axis. In Canada the utility frequency is 60hz at 120V AC.
   1. Graph the AC waveform that would represent a common Canadian outlet, label the equation of axis, maximum and minimum
   2. Determine a sine and cosine equation for the Canadian AC waveform.
   3. An electrical engineer is attempting to transform the Canadian AC waveform to a Malaysian waveform so as to make sure his oscilloscope which was made in Malaysia will function properly in Canada. The Malaysian utility frequency is 50hz at 240V AC. Determine the transformations that must be applied to the Canadian AC waveform to become equivalent to the Malaysian AC waveform.
   4. The electrical engineer goes to test his values on the original Canadian AC waveform however discovers a mistake his readings indicate that the voltage after 3 seconds is found to be 120V provide three possible equations which can represent this assume that the amplitudes are the same.

**Exponential:**

A skydiver is preparing to jump from a plane that is 55,000 feet in the air. He jumps from the plane and begins his descent down towards the ground at a constant acceleration. After 10 seconds, the skydiver has covered a total distance of 17500 feet from the plane. Using this information, determine/calculate the following questions or information:

1. Determine the average decrease rate of height for every second from the plane to the ground.
2. Draw a graph showing the skydivers height above the ground compared to time.
3. How long will the skydiver have travelled in 30 seconds.
4. If the skydiver is 6 feet tall, how long will it take him to reach the bottom.
5. To land safely, the skydiver has been instructed to open his parachute 1 minute before landing. Calculate the height from the ground he would be at when he opens his parachute.
6. If the skydiver had landed on a cliff 500 feet from the ground, would that change the graph, why or why not.

**Quadratic**:

It is September of 1941, a rocket engineer in German occupied Belgium, has been instructed to launch V-2 missiles on the British Isles. The Rocket engineer is stationed in the city of Bruges, Belgium and must launch the V-2 missile across the English Channel to Dover, the curvature of the earth is negligible. The V-2 rocket has a maximum altitude of 80km which it reaches after 66.5km. The trajectory can be expressed using the formula.

1. Determine the equation in vertex room form where a rocket is launched from the origin and reaches a peak of 80km after 66.5 km
2. Graph the equation created in Question 1.
3. The Rocket is beginning its flight over the English Channel when an anti aircraft gun from a battleship gun shoots at the rocket to intercept he rocket, the trajectory of the bullet can be expressed as h(d)= -2(d-40). Discover if/when the bullet intercepts the missile
4. The Rocket is aiming for Dover assuming it reaches its target how far is Dover from the launch point at Bruges, Belgium. State the distance and represent it within the factored form of an equation