

**MAT188: Laboratory #2**  
**Analysis of Drone Flight Data**

**2)** A brief description of how you applied the Engineering Problem Solving Process to solve this Level 1 problem? In particular, describe at least two ways that you considered approaching the problem during the Devising a Plan stage.

**Understanding the Problem**

From the problem, we know an equation that can model the altitude of the drone during a test flight in a given interval. We also know that the “hover height” of the drone is 9m which is defined by  $h=0$ . The question is asking us “at what times does the drone reach the hover height exactly?”. Another way to understand this, is that the question is asking us when in the graph does  $h=0$  or what are the roots of the graph. A good answer for this will look like points, where the graph of the altitude and the horizontal (t) axis meet/roots of the graph.

**Devising a Plan**

Using MATLAB, we can find the roots of the graph easily. This can be done using the roots function in the program itself. This function locates the roots of the graph, given the coefficients of the equation, and we can plot the points on the graph as well. Another way to determine the roots of the graph is to use the find function where we program it to find all points where  $h=0$ . We are also able to plot these points on the graph to see them much better

**Carrying Out the Plan**

I decided to carry out the roots function plan. While creating the code, I realized I first had to expand the equation given in the problem to determine the coefficients of the function. Then, I used those coefficients in the roots function to find the roots of the equation. Finally, I just had to plot them on top of the existing graph and now the roots of the graph are visible.

**Looking Back**

The question asked for the times that the drone reaches its hover height ( $h=0$ ). Looking at the graph I made on MATLAB, the red dots clearly indicate the exact times that the drone reaches its hover height ( $h=0$ ). The question has clearly been answered and can be seen in the graph.