Name: _____ Date: _____

Rocket Science Investigation

A model rocket blasts off and its engine shuts down when it is 25 m above the ground. Its velocity at that time is 50 m/s. Assume that it travels straight up and that the only force acting on it is the downward pull of gravity. In the metric system, the acceleration due to gravity is 9.8 m/s^2. The quadratic function $h(t) = \frac{1}{2}(-9.8)t^2 + 50t + 25$ describes the rocket's **projectile motion**.

Step 1: Define the function variables and their units of measure for this situation.

Step 2: What is the real-world meaning of $h(0) = 25$?

Step 3: How is the acceleration due to gravity, or g, represented in the equation? How does the equation show that this force is *downward*?

Next, you'll make a graph of the situation using Desmos.

Step 4: Graph the function $h(t)$. What viewing window shows all the important parts of the parabola?

Xmin: Ymin:

Xmax: Ymax:

Xscl: Yscl:

Step 5: How high does the rocket fly before falling back to Earth? When does it reach this point?

Step 6: How much time passes while the rocket is in flight, after the engine shuts down?

Step 7: What domain and range values make sense in this situation?

Step 8: Write the equation you must solve to find when $h(t) = 60$.

Step 9: When is the rocket 60 m above the ground? Use the graph or table of the function on Desmos to approximate your answer.