

Warm-Up Problems

The height of a rocket during the first three seconds of its launch is given by the formula

$$h(t) = t^3$$

where t is measured in seconds and h in meters.

1. Sketch a graph of the height of the rocket for the first three seconds of its flight.
2. Draw a tangent line to the graph at $t = 2$, and estimate the speed of the rocket at this time.
3. Compute the average speed of the rocket between $t = 1$ and $t = 3$. What does this correspond to on the graph?
4. Compute the average speed of the rocket over the following time ranges:
 - (a) Between $t = 2$ and $t = 2.1$.
 - (b) Between $t = 2$ and $t = 2.01$.
 - (c) Between $t = 2$ and $t = 2.001$.
5. What is the speed of the rocket at $t = 2$?