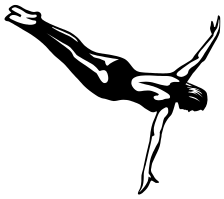
Rates of Change

The La Quebrada Cliff Divers are among the most spectacular high divers; they leap off of rocky outcroppings into ocean bays. If one of these divers jumps from a spot that is 30 meters above the water, his or her height can be modeled well by a function with the rule $h(t) = 30 - 4.9t^2$ (height in meters and time in seconds).

1) Use your graphing calculator to sketch a graph of the diver's height $h(t)$ at time $t \geq 0$. Be sure to adjust your window appropriately.



2) Determine how long it will take for the diver to reach the water (height = 0).

3) Determine the number of seconds that has passed when the diver reaches the maximum height. What is the maximum height?

3a) Determine the height of the diver after 0.5 seconds has passed.

b) Determine the height of the diver after 2 seconds has passed.

c) Create two ordered pairs based on your answers to parts a) and b). Label these two points on the graph sketched above. Draw a line connecting these two points. This is called a ***secant line***.

d) Find the slope of the secant line.

e) Determine the average speed of the diver over the time period from 0.5 seconds to 2 seconds . Remember that speed represents meters per second. In order to do this, you must find the change in height and the change in time and write it as a ratio of *m/s*.

4) Determine the average speed of the diver from 0 seconds to 0.75 seconds.