A JUMP INTO THE RIVER

At time **t = 0**, Davita jumps into a deep pool in the river from the top of a rock that is **36 feet** above the water.
Davita's position is given by the function **s(t) = –16t² + 36** where signed distance **s(t)** is in feet and time **t** is in seconds.

1. What is Davita's velocity at **t = 0.5** seconds?   How high above the water is she at this instant?
    (Answer in ft per sec, then in miles per hr.)

2. When does Davita hit the water?   What is Davita's velocity at the instant of impact with the water?
    (Answer in feet per second, then in miles per hour.)

3. Acceleration is the rate of change in velocity with respect to time, that is **(v_2 – v_1) / (t_2 – t_1)**.
    Acceleration is measured in velocity per time unit, e.g., $\dfrac{feet\ per\ second}{second}$ or $\dfrac{miles\ per\ hour}{hour}$.
    What is Davita's acceleration from time **t = 1** to the time she hits the water? (Answer in ft/sec per sec.)

4. Complete the table.

t	0	0.5	1	1.5	2
s(t)					
s'(t)					
s''(t)					

5. Graph the distance function, the velocity function, and the acceleration function in the graphs below.

distance
(feet)

velocity
(ft/sec)

acceleration
(ft/sec per sec)