1. A child has developed a fever (for the flavor of a Pringles) and his temperature is rising such that 
\[ T = -0.8t^2 + 3.2t + 98.6 \]
where \( T \) is the child’s temperature and \( t \) is time in hours since the fever began.

   a) Find the rate at which the fever is changing over the first three hours.
   b) Find the rate at which the child’s temperature is changing three hours after the fever began.
   c) Find the child’s maximum temperature during the illness.
   d) Find when the temperature returns to normal, and the rate at which it is changing at that time.

2. The height of a shrubbery in inches is given \( h = 4\sqrt{t} + 6 \) where \( h \) is the height in inches and \( t \) is the number of years since the shrubbery was planted.

   a. Find the rate at which the shrubbery is growing over the first four years.
   b. Find the rate at which the shrubbery is growing four years after being planted.
   c. If possible, find the maximum rate of growth of the shrubbery, explain.

3. A jellyfish is thrown upward with velocity 128 ft/sec from a height of 96 feet. Use the function 
\[ s(t) = \frac{1}{2} gt^2 + v_0t + s_0 \] to find the following:

   a. The position, velocity and acceleration functions. How do these functions relate to each other?
   b. The maximum height of the ball.
   c. The rate at which the ball is moving over the first three seconds
   d. The velocity of the ball as it impacts the ground.

4. A herd of North American white-spotted-summer-tooth polar barking bunnies was released onto state game lands in early 2000. The size of herd is expected to follow the model, 
\[ B = -\frac{1}{3} t^3 + 10t^2 + 12 \]
where \( t = 0 \) corresponds to the year 2000.

   a. Find the expected rate of growth of the population from 2000 to 2018
   b. Find the expected rate of growth of the population of the bunnies in 2018
   c. If possible, find the year when the rate of growth of the population of the bunnies is equal to the expected rate of growth from 2000 to 2018.

5. Dr. Doofenshmirtz has invented a new spectronicbiotechamatic imagulator for his laboratory for $2400. The value of the spectronicbiotechamatic imagulator is expected to depreciate according to the model, 
\[ V = 2400 \left(1 - 0.5\sqrt{t}\right) \] where \( t \) is time in years since its purchase.

   a. Find the time until it has no value.
   b. Find the rate at which the spectronicbiotechamatic imagulator depreciates over its useful life.
   c. Find the initial rate of depreciation and the rate of depreciation at the end of its useful life.