

Name _____

1. (4 points) Given that $\frac{dq}{dt} = 3q^{1/3}$ and $q(0) = 64$, use Euler's Method with $\Delta t = 2$ to obtain an estimate for $q(8)$.

2. (2 points) Suppose that the population of a town is always growing at a rate which is proportional to the square root of the population itself. Suppose further that the population is currently 900 and is currently growing at a rate of 15 people per year. Find a differential equation with initial value to model the population of this town. Use P for the population t years from now.

3. (2 points) Let S represent the number of squirrels on a small island t years from now. There are currently 500 squirrels living on the island and the population is expected to increase by 10 squirrels per year.

(a) Find a differential equation with initial value to model the number of squirrels on this island.

(b) Find an explicit formula for the number of squirrels on this island.

4. (2 points) Let R represent the number of rabbits in a large wooded area t years from now. There are currently 100 rabbits living in this area and the population is expected to increase at a continuous rate of 5% per year.

(a) Find a differential equation with initial value to model the number of rabbits in this area.

(b) Find an explicit formula for the number of rabbits in this area.