

## Doubling Time

The time it takes a growing quantity to double

$$h(t) = ab^t \rightarrow 2a = ab^t = 2 = b^t$$

$$\rightarrow 2 = e^{rt} \leftarrow \text{continuous}$$

Ex. 1 A certain bacteria doubles in 5 days. If initially a sample contains 20 grams, what will be the new mass in 12 days?

$$2 = b^5$$

$$2^{1/5} = b$$

$$1.149 = b$$

$$f(12) = 20(1.149)^{12} \\ = 105.89 \text{ grams}$$

Ex 2 A population is initially 500, if it is growing at an annual rate of 21% ~~per~~ year, how many years before the population doubles?

$$2 = 1.21^t$$

$$\log_{1.21} 2 = \frac{\log 2}{\log 1.21} \approx 3.6 \text{ yrs}$$