

# Lecture 13 Examples: Exponential Growth and Decay

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[math.dartmouth.edu/~blogsdon/examples13.pdf](http://math.dartmouth.edu/~blogsdon/examples13.pdf)

(Modified Stewart 3.8 exercise 3, p. 245) A bacteria culture initially contains 50 cells. When introduced into a nutrient broth, the culture grows at a rate proportional to its size. After 1.5 hours the population has increased to 975.

- (a) Find the number of bacteria after 3 hours.
- (b) Find the rate of growth after 3 hours.
- (c) After how many hours will the population reach 250,000?

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(Modified Stewart 3.8 example 2, p. 241) The half-life of radium-226 is 1590 years. A sample of radium-226 has mass 100 mg.

- (a) Find the mass remaining after 1000 years correct to the nearest milligram.
- (b) What is the rate of change of the mass after 500 years?
- (c) When will the mass be reduced to 30 mg?

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(Modified Stewart 3.8 example 4, p. 243) If \$5000 is invested at 2% interest, compounded annually, how much is the investment worth after 5 years?

What if the interest is compounded semiannually? Quarterly?  
Continuously?