Exponential Growth and Decay

Compound Interest Formulas

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$A = Pe^{rt}$$

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$$y = Ce^{kt}$$

1. If an initial investment of $2,500 is compounded continuously at a rate of 8.5%, how long would it take for your investment to double?

2. Which option is better for an initial investment of $3,000?

    a) compounded continuously at 7% for 10 years

    b) compounded daily at 8% for 10 years

3. The population of a city is increasing exponentially. In 1990 there were 25,000 people and in 2008 there were 36,000 people.

   a) Find the initial population if the city was founded in 1950.

   b) When will the population reach 75,000?

4. Carbon-14 has a half-life of 5,715 years. If the initial quantity is 100 grams, how much will remain after 200 years?

5. Carbon-14 has a half-life of 5,715 years. What percent will remain after 1,000 years?

6. Carbon-14 has a half-life of 5,715 years. When will 25% of carbon remain?