# 8-3 Solve Exponential Functions

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1. Solve the exponential equations.
2. 
3. 
4. 
5. Compounded interest.

T & V Credit Union is offering a 9% annual interest rate, compounded monthly, on new savings accounts of $10,000.00 or more. Jamie has $13,000.00 in a savings account National Bank, which pays her 7.5% interest annually, compounded continuously. She likes the bank, and will move her savings and open a new account at T & V Credit Union *only* if she determines that her savings will increase to $15,000.00 within 18 months.

1. Use the appropriate compounded interest formula and determine how long it would take Jamie’s savings to increase to $15,000.00 if she switches to T & V Credit Union.
2. Should she make the change?
3. If Jamie leaves her savings in the account at National Bank, how long will it take for her to double her money?

1. Radioactive decay.

You have 4 kg of the radioactive isotope Radium-226 (), which has a half-life of 1,620 years.

1. Use the exponential decay formula for radioactive isotopes to determine the function for the decay of .
2. How much of the will remain after 1,000 years?
3. How long will it take for the quantity to decay to 1.25 kg or less?
4. Population growth

For the demographics unit in his World History class, Rueben is investigating the changes in population in his county. Through the internet and county land records, he has been able to collect the following data:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | 1950 | 1970 | 1990 | 2010 |
| **Population** | 23 | 767 | 28,128 | 1,030,118 |

Rueben believes this represents exponential growth. His research and experience in algebra confirm reveal that the best type of function to represent this growth is , where *a* is the population at the first (or base) year of data collection, *k* is a growth constant based upon the county and its growth data, and *P* is the population *t* years after the base year.

1. Use (i) Rueben’s data and exponential growth equation, (ii) logarithm rules, and (iii) substitution techniques to determine the equation of the growth function for Rueben’s county.
2. Based on your equation, what will the county’s population in 2025?
3. Assuming that future growth will continue at this exponential rate, in what year will the county’s population reach or exceed 25,000,000?