TRS 92: Exponential Functions and Half-Life Time

1. Uranium-234 has a half-life of 1.2 minutes (source: http://en.wikipedia.org/wiki/Radioactive_decay), which means that the amount of Uranium-234 decreases at a rate of about 44% per minute.

    a. Create an exponential equation that models this decrease if you start with 150 grams of Uranium-234. Also define the independent and dependent variables you use.

    b. How much Uranium-234 will be left after 5 minutes? Show your work.

    c. Using guess and check, how long will it take for there to be 0.5 grams left? Show your work.

2. If you drink a cup of coffee containing 100 milligrams of caffeine, the amount of caffeine left in your body will decrease by about 13% each hour.

    a. Create an exponential equation that models this situation. Also, define the independent and dependent variables you use.

    b. Determine the half-life time of the caffeine in your body using the equation you wrote in **part a**. Show your work and/or write an explanation about how you found the half-life time.

Use the *Walgreen* article for the following problem.
3. Using the revenue statement in Paragraph 7,
    a. Determine what the previous revenue amount was before the 9% increase.

    Let **t**, the independent variable, represent time in quarters. Let **R**, the dependent
    variable, represent the revenue in billions of dollars.
    b. Write the exponential equation for this situation using the revenue amount
        calculated in **part a**.

    c. Using the equation you wrote in **part b**, find $R(8)$ and interpret this in the context
        of the problem.

    d. Using the equation you wrote in **part b**, use guess and check to find when
        revenue will reach $30 billion, if this trend continues.

Complete MML: Exponential Functions