

Exponential Relationships: Questions

1. Suppose you invest \$1000 in an account that earns interest at 5%, compound annually. That is, each year you have 1.05 times as much money as you did the year before.
 - a) Write an equation that relates the amount of money in the account, A , to the number of years elapsed, n .
 - b) Suppose you deposited this \$1000 now and took the money out in 55 years when you retire. How much will the account be worth then, assuming you don't put any more money or take any money out?

2. The Mercedes Benz SLR McLaren is currently selling for \$495,000.
 - a) Brandon buys a McLaren today. Assuming that the car loses 30% of its value each year, estimate how much he could sell the car for in 2015 (5 years from now). Please show your work.
 - b) A Ford Focus will sell for \$15000 in 2020. In 10 years, what will be worth more, the 10-year-old McLaren, or the new Ford Focus?

3. Some cells in your body divide every 24 hours (1 day).
 - a) If you get a stem cell injection of 1000 cells, write an equation relating the number of stem cells (N) to the number of days elapsed (n), assuming each cell divides once each day (each single cell become 2 cells).
 - b) How many cells will this represent after 1 week?

4. You can detect whether or not someone has smoked a cigarette in the past few months by measuring the amount of **cotinine** in his/her urine.
 - a) Suppose you are an active smoker who decides to quit. The day of your last cigarette, your urine will typically contain 500 nanograms (ng) of cotinine per millilitre. The biological half-life of cotinine is about a day. Please give an equation relating the concentration of cotinine in your urine, C , to the number of days since you quit, n .
 - b) What is the concentration of cotinine in your urine 1 week after you stop smoking (include units)?