Compound Interest — Math 111

1. In one episode of Futurama, Fry discovers that the \$0.93 in his bank account has been accruing interest for the last 1,000 years.

   (a) In the episode, Fry's bank paid interest at 2.25% per year (compounded annually). How much money does Fry have? Is it more than a million? A billion? A trillion?

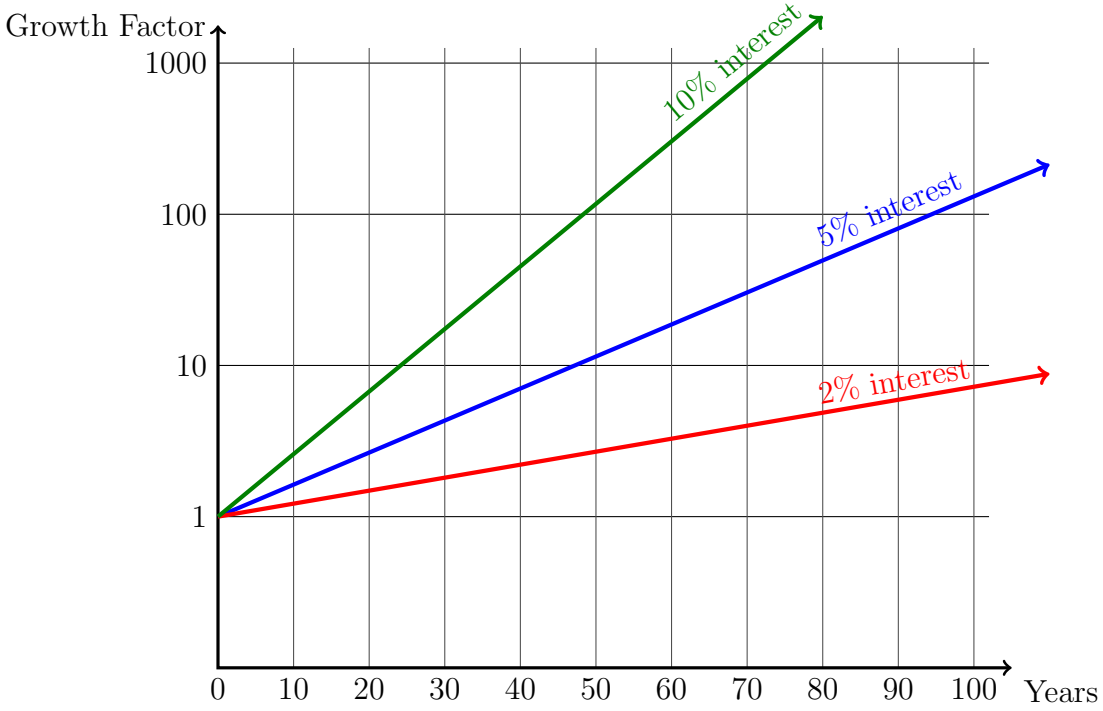
   (b) If Fry had invested his money in an account paying 2.5% annually how much money would he have? How many orders of magnitude more would he have than in part (a)?

   (c) In real life, inflation makes stuff more expensive, which offsets the benefits of compound interest. Suppose inflation averaged 1.2% for the 1000 years between 2000 CE and 3000 CE. If a can of coke costs \$1 in the year 2000, how much would it cost in 3000 CE (assuming coke still exists and the cost just kept of with inflation)?

   (d) How many cans of coke could Fry buy with his money?

   (e) Do you think Fry could have bought a house with his money in 3000 CE?

2. The log-linear graph below shows the factor by which an investment will grow for different interest rates and time periods.



(a) After 50 years, how many times bigger is an investment at 10% annual interest than the same sized initial investment at 5% interest?

(b) After 80 years, how many times bigger has an investment at 2% interest become? What about an investment at 5% interest?

(c) How can you tell that the vertical axis on the graph above is log-scale? Explain.