The Fidelity Capital Appreciation Large-Cap Growth mutual fund has a three year average rate of return of 7.72%.
Suppose this rate of return is continuous over the three year period.

1. If you put $10,000 in the fund three years ago, how much would you have in the fund now?

2. If you want to have $50,000 in the account now, how much should you have put in three years ago?

3. Do you think that the assumption of a continuous rate of return is realistic?

The Third National Bank of Springfield advertises 7.0% interest compounded continuously, but charges depositors a $100 annual fee for maintaining the account. For simplicity, assume that the fee is deducted continuously over the course of the year. If $y(t)$ represents the value of an account after t years, then the DE that models this situation is

$$y' = 0.07y - 100$$

1. Show that $y = \frac{100}{0.07} + Ce^{0.07t}$ is a solution to this differential equation.

2. If $10,000 is deposited in the account now, how much will it be worth in 8 years?
   Notice that you'll need to find the value for C to answer this.

3. The bank also offers an account paying 6.3% interest compounded continuously but without any annual fee. What would be the difference if you deposited the $10,000 in this account for 8 years?