

Samantha Stoddard

Investment Project

Math 135-01

In order to find how much I need to invest at age 22 to support myself when I retire at 65 and be able to live until I am 85 at a minimum of \$30,000 per year, I will have to determine the initial investment and the rate at which that interest is compounded. The method I used to find the initial value was to guess and check using the following equation:  $Pe^{rt}$  in which P is the initial value invested at 22, r is the rate at which the interest is compounded, and t is the amount of time that has elapsed since the age of 22 to the age of 65. Each year after the age of 65 I used the equation:  $(A - 30,000)e^{rt}$  where A is equal to the previous year's balance, and t is now equal to 1.

Using excel, I originally entered an initial value of \$10,000 that compounded at a rate of 5%. This proved to be insufficient as I would run out of money by the age of 68. I entered different amounts of money until I found that at a compounded rate of 5% I would need to invest \$46,579 in order to not run out of money by the end of your 85th year.

I continued checking my formula by changing the compounded interest rate to 10%. At a compounded interest rate of 10% the initial value needed would be at least \$3,754 to not run out of money by the end of my 85th year.

As long as by the end of my 85th year the balance is equal to or greater than 0 when using the formula I should be able to find out the needed initial value at a certain interest rate, or needed interest rate at a certain initial value.