Activity 8

Time Value of Money: Growing Annuities

Group:

Section:

1. You hope to retire in 30 years, and can afford to save 10% of your salary each year. You make payments at the end of each year, including year 30. Your salary over the coming year is $100,000, but you expect it to grow at 2% per year, and you assume a 7% annual return on your 401k. How big will your “nest egg” be at retirement?

2. You hope to retire in 30 years. When you do, you would like to have the *purchasing power* of $100,000 today during each year of retirement. Your cash is needed at the beginning of each year of retirement, and inflation is expected to be 3% per year from now until the end of your retirement. Your retirement will last 25 years, and you expect your 401k to earn 5% per year during your retirement. How much money do you need at the *beginning* of your retirement years, to just meet your retirement needs (i.e. what is the size of your needed nest egg)?

3. (Optional) You land a job that starts shortly after you graduate. They are offering a salary of $60,000 per year. You expect your salary to grow by 2% per year until you retire, and you plan to retire after 45 years of work. During each year of retirement—you plan for 25 years of retirement—you would like to have the purchasing power of $80,000 today. Inflation is expected to be 2.5% per year forever, and you will make your withdrawals at the beginning of each year of retirement. You plan to contribute a constant percentage of your salary into your 401k at the end of each year of work, excluding the final year. The 401k is expected to return 8% per year during each year of contributions, and 3% per year afterwards (i.e. during retirement and the year before it). Note that you retire one year *after* you make your last payment. What percent of your salary must you contribute, assuming you keep this percent going throughout the saving window?