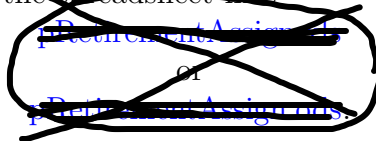


- *Title:* Retirement Planning
- *Background:* Most people wish to work for 35 to 48 years making a decent wage and then retire comfortably for their later years in life. Each person may have a different definition of “decent” and of “comfortably”, but whatever our definition we see the previous statement as applying to us and people we know. In order to plan for retirement one needs to have a target income in mind, to have an expected number of years to live at that income and to save money. Social Security can provide some of the savings and income, but we will ignore that for this exercise. Our concern will be with the individual’s savings as well as employer contributions.
- *Scenario:* You are a numerate person with a basic understanding of compound interest and spreadsheet skills. You have a friend, relative or client who approaches you with her or his current financial conditions, expected career growth and goals for retirement. You agree to crunch the numbers for her or him to determine if the goals are realistic or not. Your reply will explain whether the goals are achievable. If they are achievable, you will demonstrate a plan to achieve them. If they are not achievable, you will demonstrate what is achievable.
- *Information and Assumptions:* You will have the following information to use as parameters in the retirement plan. ~~This information for each student is linked from the EDT data page in one of the spreadsheet files.~~



Your student number is assigned by your instructor.

1. Beginning Salary: The amount of money he or she receives for working the first year.
2. Expected Average Raise: The percentage increase of the salary from one year to the next.
3. Expected Employer Contribution Cap: The highest percentage of the salary that the employer is willing to contribute toward her or his retirement in a given year.
4. Expected Average Interest Rate on Savings Before Retirement: The yearly interest rate to use to calculate the rate of growth of savings placed in the retirement account while he or she is working.
5. Expected Average Interest Rate on Savings After Retirement: The yearly interest rate to use to calculate the rate of growth of savings in the retirement account during her or his retirement years.
6. Expected age of retirement.
7. Expected years of retirement.
8. Retirement income goal as a percentage of working income.

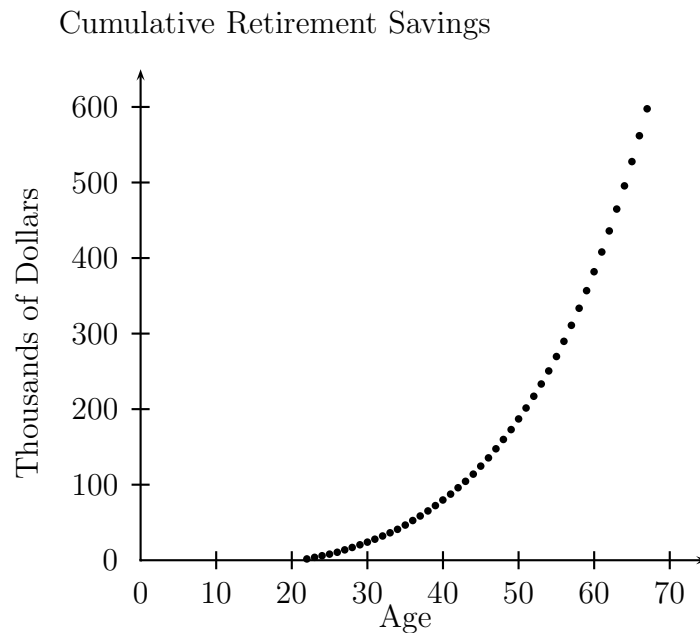
Assumptions are made to make sure everyone is solving a similar problem and to simplify the calculation process. You will use the following assumptions in solving this problem.

1. The client comes to you when he or she is 22 years old.
2. Constant rates will be used. This is not realistic, but it is a reasonable simplifying assumption. The constants may be interpreted as the average over a long period of time.
  - (a) The client will receive the same percentage raise each each year.
  - (b) The interest rate on the balance of the retirement account while working will be the same each year.
  - (c) The interest earned on the balance of the retirement account will be the same each year after retirement.
3. The interest earned on the retirement account while working will be greater than or equal to the interest earned on the retirement account during retirement. This assumption reflects the strategy that many people will have a higher risk investment while working and a lower risk investment upon retirement. A lower risk investment will tend to have a more stable but lower rate of return than a higher risk einvestment.
4. Calculations will be done reflecting once per year changes in balances, salary and contributions. This means contributions will appear to be made at the end of each year. Thus, current year contributions do not earn interest.
5. The desired retirement income will be a percentage of the average salary for the last 3 years of work.

In addition to the global assumptions used by everyone, you will need to make and state your own assumptions about a minimum of 2 items.the

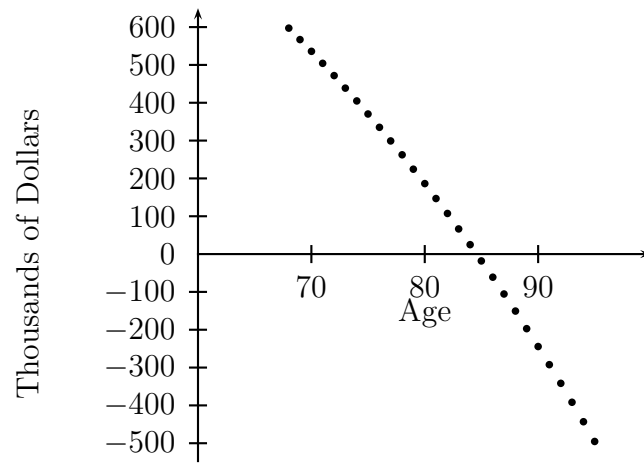
1. The least amount of money the client needs to live on during the working years. This will affect the maximum amount he or she can save. This can be affected by
    - (a) assumed family size,
    - (b) number of other incomes in the household,
    - (c) standard of living (small apartment, large house, travel, entertainment, *etc.*),
    - (d) general cost of living in a region.
  2. The balance in the retriement account when the client dies. Some people might wish for a balance of \$0, because “You can’t take it with you.” Some people may want a high balance to serve as an inheritance for others.
- *Employer Matching:* Employers will often match an employee’s contributions toward retirement but only to a certain percentage of the employee’s salary. For example, let’s assume an employer matches what an individual saves up to 5% of the individual’s income. If the individual makes \$30,000 per year, the employer will never add more than \$1,500 to the individual’s savings plan, since that is 5% of \$30,000. If the individual saves \$1,000, the employer will match that \$1,000 for a total savings of \$2,000 for that year, since \$1,000 is less than \$1,500 (5% of \$30,000). Notice it is a dollar for dollar match.
- If the individual saves \$3,000, however, the employer will only match the first \$1,500. Therefore, the total contribution for the employee and employer is \$4,500 (\$3,000 + \$1,500).

- *Task:* Your task is straightforward.
  1. Look up your individual's financial information and goals.
  2. Determine if he or she can reach his or her goals given his or her financial information and reasonable assumptions. If the goals are achievable, give a savings plan that demonstrates this. If the goals are not achievable, demonstrate the maximum retirement income he or she should expect.
  3. Document your work with a report.
- *Report Format:* You will most likely find it easiest to write your report if you break it into sections.
  1. Introduction, financial information and retirement goals: Write a short introduction to the problem and state the financial information you are given about your person. You could call the person by name, if you wish.
  2. Assumptions: Restate in your own words the assumptions given above and add the assumptions you made.
  3. Calculations: Explain how the final figures are calculated.
    - (a) How is the salary determined from year to year?
    - (b) How is the employer contribution determined each year?
    - (c) How is the balance in the retirement calculated from year to year both before and after retirement?
  4. Salary and savings summary: Give the average of the last 3 years of salary. For example, this could be \$57,400. Mention the age of retirement. For these data it was 67. Show a graph of the savings during the working years. It should probably look similar to the graph below. It assumes a person will save a little more each year and reflects the compounding of the interest.



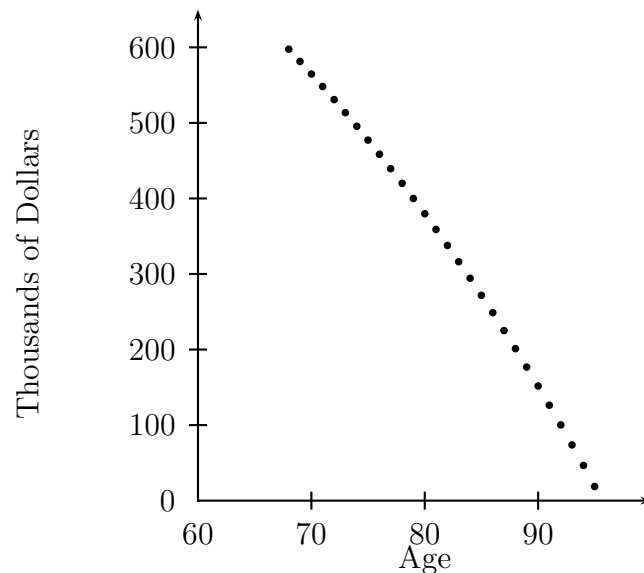
5. Retirement income summary: Give the retirement goal of the salary. This might be 75% of the average of the last 3 years of the salary. For \$57,400 this is \$43,050. Plot the retirement balance for the retirement years. For this case it became negative before the end of retirement.

Retirement Balance with Goal Payout



~~Since the balance went negative, 75% of the average of the last 3 years of the salary is too high a goal. Plot the retirement balance for the retirement years for a payout that works. For this case a payout of about 50% of the average of the last 3 years of salary works.~~

Retirement Balance with Lower Payout



6. Closing: Restate the findings. Either the person's goals are attainable, or they are not. If they are not, you have shown what is attainable.
7. Data: On its own page give a tabular listing of the salary and savings balance during the working years.

Age	Salary	Personal Contribution	Employer Contribution	Retirement Balance
22	\$23,000	\$920	\$920	\$1,840
23	\$23,483	\$939	\$939	\$3,805
24	\$23,976	\$959	\$959	\$5,902
⋮	⋮	⋮	⋮	⋮
66	\$57,393	\$5,739	\$3,444	\$561,807
67	\$58,598	\$5,859	\$3,516	\$597,587

~~On its own page give a tabular listing of the retirement balance during the retirement years. Probably, this should be for a payout that works.~~

Age	Payout	Balance
68	\$28,700	\$597,587
69	\$28,700	\$581,437
70	\$28,700	\$564,947
⋮	⋮	⋮
94	\$28,700	\$46,464
95	\$28,700	\$18,740

- *Grading:*

Your write up for your project should be neat and easily read. It should include your name and date. It should be written in a report style with complete sentences, transitions and proper headings. Any references used should be cited. Your grammar and spelling will be evaluated. We will specifically check the following:

1. Assumptions: Assumptions are stated clearly, and all assumptions used are represented.
2. Calculations: Calculations are correct and complete.
3. Analysis: Conclusions are based on the data presented and limited to the scope of the problem.
4. Representation: Relevant information is represented in appropriate words, formulas, graphs and tables.
5. Interpretation: Explanations of formulas, graphs and tables are correct.
6. Communication: The overall format, flow and grammar should add to the clarity of the solution.