

Name: _____

Finance

Directions:

For this project all work must be your own. You may neither accept nor receive help finding the solutions to the questions contained in the project. Please sign below that you understand the rules and will not receive help with this project.

Please Sign Here: _____

Your project must be completed on separate pieces of paper and all work must be shown. Typing the project is strongly preferred, but you do not need to type the equations. Instead, you may leave space in your document to write by hand the equations and the supporting work.

Compound Interest Formula

The following formula will be required to complete the first part of the project. If you put P dollars in an account that pays an annual interest rate r and compounds n times per year, the amount of money A you will receive after t years can be determined by the following formula:

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

Note: A and P are dollar amounts and the interest rate r must be written as a decimal (for example, $5\% = 0.05$ and $1.5\% = 0.015$). Most savings accounts are compounded monthly, which means $n = 12$, for twelve times per year. If an account is compounded quarterly you use $n = 4$.

Part A. Saving for Retirement in a Savings Account

1. Suppose you manage to save \$30,000. To save the money for retirement, you decide to put it in a savings account that pays 3% interest compounded monthly.
 - a) Using the compound interest formula, compute how much money you will have in the savings account after 15 years. Be sure to show your steps.
 - b) Now compute how much money you will have after 45 years.
2. Suppose you find an account that pays 4.5% interest compounded monthly for your \$30,000 (instead of the 3% above).
 - a) Using the compound interest formula, compute how much money you will have in the savings account after 15 years. Be sure to show your steps. How much more money would you have in your account than in part 1a?

- b) Now compute how much money you will have in the account after 45 years. How much more money would you have in your account than in part 1b?
- c) How can you explain the difference between how much money you will have in your account in numbers 1 and 2?

Part B. Saving for retirement using a dividend-paying stock or fund.

Some companies pay a dividend (a portion of their profits) periodically to shareholders of their stock. Most people who save for retirement choose to invest in dividend-paying stocks rather than just putting all their money in savings accounts. Under certain circumstances you can use the compound interest formula to estimate how much your investment in a stock or fund will grow over time through dividends. In this case we will use the annual dividend yield of a stock as the interest rate r in the compound interest formula. For example, if the annual dividend yield is 5.5%, we would use $r = 0.055$ in the compound interest formula. (Really the formula only estimates the amount you will earn through dividends. If the stock goes up in value, you could make much, much more. If the stock goes down in value by the time you retire, you will lose money.)

3. Choose a stock from the information provided on the last page of the project packet. Suppose that instead of putting your \$30,000 from Part A in a savings account, you buy \$30,000 worth of shares of your chosen stock. (In practice you wouldn't want to put all of your savings into one stock, but for simplicity's sake we'll work with one stock in this project.) The number of compoundings per year in the formula n is how many times per year your stock pays a dividend, which is in the information about your stock.
 - a) Using the compound interest formula, estimate how much your stock will be worth at the end of 15 years.
 - b) Do the same for 45 years.

Part C. Saving for Retirement with an Annuity or Retirement Savings Account

Most people don't wait until they have \$30,000 saved before investing it. In a few years you may decide that you have \$400 or \$600 per month to save for retirement, and you start saving for your retirement. A formula for computing the future value of a retirement account is:

$$A = \frac{P \left(\left(1 + \frac{r}{n} \right)^{nt} - 1 \right)}{\left(\frac{r}{n} \right)}$$

In this formula P is the amount of money you invest for retirement per compounding period. For example, if you invest in a stock that pays 6.7% four times per year, $n = 4$, $r = 0.067$, and P is the amount of money you deposit into your retirement savings every 3 months (or 4 times per year).

4. Decide on an amount that you would like to be able to save every month, after you are secure in your career, between \$300 and \$1500. **Give some justification for your amount of your monthly savings**

goal. Now multiply that monthly savings amount by three to determine how much you could deposit every three months into your retirement savings account. Using the stock or fund you used in **part B**, estimate how much your retirement account will be worth after **30 years** using the formula for a retirement account.

5. Do the same computation for **40 years**.

Stock (or Fund) Choices:

Company or Fund Name	General Electric
Ticker Symbol	GE
Dividend Yield (r)	3.3% ($r = 0.033$)
Dividend Frequency per Year (n)	Quarterly ($n=4$)

Company or Fund Name	AT & T
Ticker Symbol	T
Dividend Yield (r)	4.8% ($r = 0.048$)
Dividend Frequency per Year (n)	Quarterly ($n=4$)

Company or Fund Name	Aircastle LTD
Ticker Symbol	AYR
Dividend Yield (r)	5.3% ($r = 0.053$)
Dividend Frequency per Year (n)	Quarterly ($n=4$)

Company or Fund Name	PIMCO Opportunity Bond Fund
Ticker Symbol	PTY
Dividend Yield (r)	7.9% ($r = 0.079$)
Dividend Frequency per Year (n)	Quarterly ($n=4$)

Or Choose your own:

Company or Fund Name	
Ticker Symbol	
Dividend Yield (r)	
Dividend Frequency per Year (n)	Quarterly ($n=4$)