

## Lab Framework

**Text: Financial Algebra**

**Unit number and title:**

**Short Description:** Unit 3-7 Future Value of Investments

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**Date:** June 27, 2012

### Lab Title

Comparing Investment Rates and the Best Option for a Return on Investment

### Lab Plan

**TEACHER:** Teacher Prep/Lesson Plan

- **Lab Objective**  
To determine which investment firm would accrue the highest return on investments
- **Statement of prerequisite skills needed** (i.e., vocabulary, understanding compound interest, formulas)  
Understand the formulas  $B = P(1 + r/n)^{nt}$  and  $B = (P((1 + r/n)^{nt} - 1))/(r/n)$  and how to implement these formulas using the TI-84 Plus calculators.
- **Vocabulary**  
Interest  
Interest rate  
Principal  
Compound interest  
Annual, quarterly, monthly compounding  
Bar charts  
Future value of a single deposit investment  
Future value of a periodic deposit investment
- **Materials List**  
TI-83+ or TI-84+ graphing calculator
- **State Standards addressed**  
A1.7.B  
**Analyze functions using different representations**  
Use the property of exponents to interpret expressions for exponential functions (identifying rate of change and classifying as representing exponential growth or decay).
- **Leadership Skills**  
Teamwork and presentation skills
- **Teacher Assessment of student learning** (scoring guide, rubric)  
Rubric will be created to score the graph information, the calculations, and the presentations

The teacher will also observe your work habits

## STUDENT INSTRUCTIONS

### Statement of problem addressed by lab

You are a smart young person at age 21 who has already completed the carpentry apprenticeship program. The economy is picking up and you have had strong advice to invest part of your income and to always be faithful to that investing. You consulted with those in the know and you begin your long range plans. The year is 1969 and these were the options that you pursued over the 30-year time span.

## Investment Investigation

**Years**    **1969-1975**    **1975-1979**    **1979-1981**    **1981-1985**    **1985-1994**    **1994-1999**

Various monthly investments in parentheses

| Rates                          | Interest |      | Interest |      | Interest |       | Interest |       | Interest |      | Interest |      |
|--------------------------------|----------|------|----------|------|----------|-------|----------|-------|----------|------|----------|------|
| <b>Bank A<br/>Quarterly</b>    | (\$100)  | 3.65 | (\$200)  | 8.15 | (\$300)  | 15.00 | (\$350)  | 9.00  | (\$400)  | 7.25 | (\$500)  | 5.25 |
| <b>Bank B<br/>Monthly</b>      | (\$100)  | 3.55 | (\$200)  | 8.10 | (\$300)  | 16.20 | (\$350)  | 7.50  | (\$400)  | 7.95 | (\$500)  | 4.15 |
| <b>Broker's<br/>Yearly</b>     | (\$100)  | 4.10 | (\$200)  | 8.20 | (\$300)  | 17.00 | (\$350)  | 8.20  | (\$400)  | 6.20 | (\$500)  | 3.45 |
| <b>Gov't Bonds<br/>Monthly</b> | (\$100)  | 3.20 | (\$200)  | 6.50 | (\$300)  | 10.00 | (\$350)  | 10.00 | (\$400)  | 8.15 | (\$500)  | 5.15 |

$$\frac{B = P((1 + r/n)^{nt} - 1)}{r/n}$$

$$B = P(1 + r/n)^{nt}$$

This will require that you use both the single deposit investment formula and the periodic investment formula. This will require meticulous work on your part since you will combining the two formulas after you have completed column. The following columns will require that you figure the single deposit investment formula for the figure from column one and the periodic investment formula for the new investment time period for the changed monthly investment.

1. You are working in groups and, therefore, should share the responsibilities in figuring out the new balances over the years.
2. You will cross check your work with others in your group for discrepancies and correct these errors.
3. You will then determine which was the better investment if the investor stayed with one option.

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### **Group instructions and roles**

1. As a group, determine what each person's job is and what they should be doing when they have completed their initial task.
2. Assign other tasks as necessary always working together.

### **Outcome instructions**

You will create four bar charts, one for each investment firm indicating the return on investment during each time period.

Using the bar charts you will demonstrate how you could have received the highest rate on return by switching to another investment firm each time you increased your monthly investment.

### **Assessment instructions**

Turn in your bar graphs, all your rate calculations, and your reasoning as to why you chose the investment firms that you did.

Name: \_\_\_\_\_ Per: \_\_\_\_\_ Date: \_\_\_\_\_

### Quiz 3-7 Future Value of Investments A

You decide to start saving for a car because you want to pay cash and not pay the bank interest on an auto loan. You are only 18 (and apparently smarter than your friends) and have started a carpentry apprenticeship to which you can walk. Therefore, you are able to save (invest) \$250.00 each month into an account that yields 4.25% interest, compounded quarterly. How much money will you have accrued in four years? Explain in your own words why you would go this route instead of borrowing \$12,000.00 from the bank at 5% interest to be paid in 60 monthly installments. Show all work.

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### Quiz 3-7 Future Value of Investments B

You go to two different banks to determine which bank would be best for you to invest \$10,000.00. Bank A offers a 5% yield compounded yearly. Bank B offers a 4.9% yield compounded weekly. Which bank should you invest your money and why? Show all work including the formulas you used as well as the formulas with all pertinent data inserted.

Bonus: Is there a time when one investment is better than the other? Can you plot the curve to determine the time if and when the two investments are the same?

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