

Math 518

Name _____ Date _____

Interest Project: Investing your Money \$\$\$

Due Date: _____

Part I

- Complete the attached sheet neatly, thoroughly, and accurately. 20 points
Show your work and use complete sentences. You may show your work on a separate sheet of paper.

Part II – Apply your knowledge to the real world!

- Complete the attached sheet neatly, thoroughly, and accurately. 20 points
You may show your work on a separate sheet of paper.

If you worked with someone else (classmate, friend, tutor, math teacher, parent, etc.) write with whom you worked below.

Part I – Investing

You have earned \$1000 working at a summer job, and you decide to invest that money so that you can buy a computer. The computer that you want costs \$1800, and you would like to be able to buy it within 3 years.



Your parents suggest that you go to the local bank and see what types of accounts are available. At the bank, the account representative discusses some options with you. You mention that you will not be withdrawing any money (principal or interest) until the account is worth \$1800.

1. The first option is a **1-year Certificate of Deposit (CD) paying 4% interest annually**. How much would this account be worth after 3 years?

Work:

Final Amount: _____

2. A **3-year Certificate of Deposit pays 5% interest annually**. How much would this account be worth after 3 years?

Work:

Final Amount: _____

3. The “1-year” and “3-year” periods for these accounts are the lengths of time that you must keep the money in the account. (You pay a penalty if you take the money out before the term is up.) Why might an investor choose a CD with a shorter term rather than a longer one, even though it pays less interest?

4. The bank has two other investment opportunities. The first one pays **7% interest each year compounded annually**. The second one also **pays 7% interest, but the interest is compounded semiannually**. Complete each table to see how the initial deposit grows over three years.

7% interest (annually)

Time (in years)	1	2	3
Work			
Final Amount			

7% interest (semiannually)

Time (in years)	1	2	3
Work			
Final Amount			

5. Would any of the four investments above allow you to buy your computer after 3 years? If so, which one(s)?

You are disappointed in these options. A friend's mother is a stockbroker, and she talks to you about the possibility of buying \$1000 worth of stock. She tells you that the price of a stock that she has been watching increased by 19% last year and that the value of stock in your favorite company has declined by 9% last year.

6. Write a **function** to describe each investment, assuming that these trends continue. Let $A(t)$ represent the amount of the investment after t years.

a. stock increasing in value 19% per year _____

b. stock decreasing in value 9% per year _____

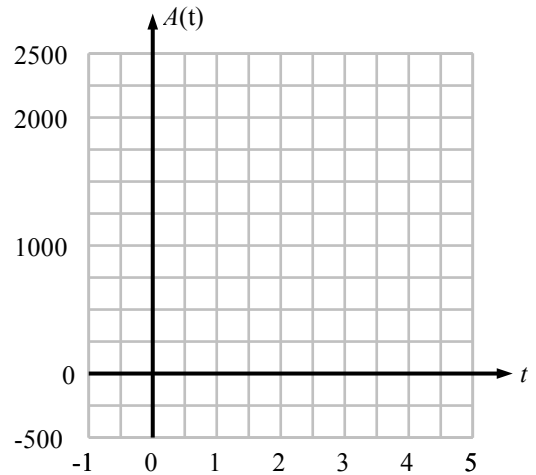
7. Using the grid at right, graph the functions you wrote in #6 above. Use only positive values of t . Complete the tables below and plot these points to help you graph the functions.

a. stock increasing at 19%

t	$A(t)$
0	
1	
2	
3	
4	

b. stock decreasing at 9%

t	$A(t)$
0	
1	
2	
3	
4	



8. Which function represents exponential growth and which function represents exponential decay?

9. Will the investment showing growth be worth \$1800 within 3 years? _____
 a. Explain how you can use the graph above to approximate how long it will take for the investment to be worth \$1800.

b. Write an equation to show how you can figure out how long it will take for the investment to be worth \$1800. Then solve the equation, showing all your steps. How long will it take, to the **nearest month**, for your investment in the growth stock to reach \$1800?

Part II – Find out what it’s really like out there!

1. Research a local bank on the web (or go visit a branch!) and find out the current interest rates for a **savings account** (or find the interest you’re getting on your own savings account right now) and for a **CD (Certificate of Deposit)**. Please see me if you need help finding this information!

- a. Name of Bank: _____
- b. Website: _____
- c. Current savings account interest rate: _____ per year
- d. CD rate and maturity: _____
- e. Is the interest compounded monthly, daily, continuously? _____



2. Let’s suppose at the end of the summer you saved \$800 from your summer job. You want to compare how much money you would have after 10 years if you put your money in a savings account or in a CD. We will assume that the interest rate stays the same over the 10 years. (Not a great assumption, but the best we can do.) Use whatever compounding method your bank uses (in other words, use your answer to 1e above).

Use the interest rates above to calculate the following:

- a. Total amount of savings after **10 years in a savings account**:

- b. Total amount of savings after **10 years in a CD**:

3. The situation above calculates the amount saved after one initial investment. Hopefully, you’ll save some money every summer. Let’s try to calculate how much money you could have in five years if you invest money at the end of every summer.

We’ll assume you save **\$1000 this summer** and you get a raise each summer so you can save **\$100 more each summer**. We’ll calculate the amount of each summer investment separately, and we will invest until the summer of 2017. Then we can add the amounts together to see the total amount in your account! (Again, assume the interest rate stays the same over 5 years and use the same compounding method the bank you visited uses.)

- a. Choose whether you'll put money in your savings account or a CD. Explain your choice.
- b. Write the general formula for compound interest. Explain what all the variables represent. Explain what values you are going to use and why for the variables in this example.
- c. Complete the following table. You may need to show your work on a separate sheet of paper.

Money deposited after each summer		Number of years money invested (until summer 2017)	Equation calculate amount of money	Value of investment summer of 2017
Money deposited summer of 2012	\$1000			
Money deposited summer of 2013	\$1100			
Money deposited summer of 2014	\$1200			
Money deposited summer of 2015	\$1300			
Money deposited summer of 2016	\$1400			
Total amount in account (add amounts in last column)				

- d. How much money **did you deposit** over the five years? _____
- e. How much money **did you make** in interest? _____