



Uncle Buck\$

Directions: Answer the following questions using the TI-Nspire handheld.

1. Your Uncle Bucks is rich, but not very good at math. He asks you how much money you have in your pocket. When you say \$1, he says that he will give you twice that amount tomorrow, twice that amount the next day, twice that amount the next day, etc., for 10 days. But, he will only give you the money if you can figure out the amount he would give you on the tenth day.

- a. Create a new document and create a Lists and Spreadsheet page.
- b. Give the name *day* to Column A and the name *dollars* to Column B.
- c. Use a sequence to fill the whole numbers 0 through 10 in the *day* column.
- d. In cell B1, type in the amount of money you have at the beginning (Day 0). What number did you put in cell B1?

- e. In cell C1, type in the factor that each day's money will be multiplied by. What number did you put in cell C1?

- f. Cell B2 should contain the number 2. How could you use the contents of cells B1 and C1 to obtain that number? Type that formula into cell B2.

- g. How could you use the cells C1 and B2 to find the value in B3? Type that formula into cell B3.

- h. In general, how do you find each cell from the preceding one?

- i. What day is B11? _____
- j. How much would your uncle be giving you on Day 10? _____

Uncle Buck\$ (cont.)

Directions: Answer the following questions using the TI-Nspire handheld.

2. Fill in the chart. In the *Factors of 2* column, put the total number of times that 2 has been used as a factor in *Dollars* to get that number. Write each number of dollars as a power of 2.

Day	Dollars	Factors of 2	Power of 2
0			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

- What would be the power of 2 for Day 20? _____
- What is the formula for Day x ? _____
- Make a scatter plot with *day* on the x -axis and *dollars* on the y -axis. Use your formula from 2b to write a function to match the graph. Graph it on the same page as the scatter plot.
- What is the y -intercept of the graph of the function, and what does it mean in terms of the problem?

Uncle Buck\$ (cont.)

Directions: Answer the following questions using the TI-Nspire handheld.

3. Return to the spreadsheet on page 1.1. Change the number in cell C1 to 3.

- What happens to the value of the money each day? _____
- Write a formula for the amount of money received on Day x and graph it in $f2(x)$ on page 1.2.

- What is its y -intercept? _____
- How does the graph compare to the previous one? _____
- What would the formula be if the money were multiplied by 5 each day?

- Check the formula on page 1.2. What is the y -intercept?

4. Return to the spreadsheet and return the number in cell C1 to 2. Change the number in cell B1 to 3.

- Your money is doubled each day. How much money did you begin with? _____
- How do the dollars compare to those in your chart in question 2? Write a formula that describes the number of dollars on day x . Check your formula on the scatter plot.

- What is the y -intercept of this graph? What does it mean in terms of the problem?

- What is the equation if you start with \$10 and the money is doubled each day?

- These equations are of the form $y = ab^x$. This is the general form for an exponential equation. What do a and b represent?



Name _____

More Buck\$

Directions: Answer the following questions using the TI-Nspire handheld.

1. In *Uncle Buck\$*, you investigated how much money Uncle Bucks would give you each day if you began with \$1, and he gave you twice as much money as he did the previous day.

Suppose that you began with \$1 and he doubled the total of all your money each day.

- Use your spreadsheet from *Uncle Buck\$*. Create a new problem page and create a Lists and Spreadsheet page.
- Give the name *day* to Column A and the name *dollar1* to Column D.
- In the *day* column, type in the whole numbers 0 through 10.
- In cell D1, type in the amount of money you have at the beginning (Day 0).
- In cell C1, type in the factor (2) that each day's money will be multiplied by.

2. Your money on day one includes your original dollar, plus the two from doubling.

- How much would you have? _____
- How can you use the spreadsheet to compute the total for day one?

- How would you compute the total in day two?

- In general, how do you compute each day?

More Buck\$ (cont.)

Directions: Answer the following questions using the TI-Nspire handheld.

3. Complete the chart below.

Day	Dollar1	Sum	Combine	Power of 3
0		1		
1		$2 \cdot 1 + 1 \cdot 1$	3	3^1
2		$2 \cdot 3 + 3 \cdot 1$	$3 \cdot 3$	3^2
3		$2 \cdot 3^2 + 1 \cdot 3^2$	$3 \cdot 3^2$	3^3
4				
5				
6				
7				
8				
9				
10				

- What is the formula for day x ? _____
- Make a scatter plot with *day* on the x -axis and *dollar1* on the y -axis. Check your formula by graphing.

4. Suppose you start with \$5 on Day 0.

- Which cell do you change? _____
- What formula describes the *dollar1* in terms of *day*? _____
- Check the formula on a scatter plot.

5. Suppose you start with \$4 and your money is tripled each day.

- Which cells do you change? _____
- Does a formula of the form $y = b^x$ work for this? Check on your scatter plot.

- Remember that you began with \$4 instead of \$1. How could you adapt the formula? Try it on your graph.



Name _____

Compound Buck\$

Directions: Answer the following questions using the TI-Nspire handheld.

In a savings account, the amount of interest depends upon how much money is in the account at the time interest is computed. This kind of interest is called *compound interest*. The amount of time that passes between when interest is compounded varies with different kinds of accounts.

1. Aileen puts \$100 in a savings account. The interest rate is 4% and the interest is compounded yearly. This means that after one year, 4% of the amount in the account is added to whatever was previously in the account. Aileen leaves all of the money in the account for five years.
 - a. On the Lists and Spreadsheet page, give the name *Time* to column A. Enter the whole numbers 0 through 6. Give the name *Total* to the column B. Enter 100 into cell B1. Put 0.04 into cell C1.
 - b. How can you use the spreadsheet to find the value in cell B2?

 - c. In general, how do you find the value in each cell?

 - d. Make a scatter plot with *Time* on the *x*-axis and *Total* on the *y*-axis. What kind of function does the shape of the scatter plot resemble?

Compound Buck\$ (cont.)

Directions: Answer the following questions using the TI-Nspire handheld.

2. Fill in the chart below.

Time	Total	Sum	Combine	Simplify
0	100			
1	104	$.04(100) + 100$	$(1+.04)(100)$	$(1.04)(100)$
2	108.16	$.04(1.04)(100) + (1.04)(100)$	$(1+.04)(1.04)(100)$	$(1.04)^2(100)$
3				
4				
5				
6				

- a. Write an equation that describes the total in the account (y) in terms of the number of years (x). Check the equation by graphing it on the scatter plot.

- b. Change the original deposit to \$1,000 and the interest rate to 2.5%. What equation describes the total in the account (y) in terms of the number of years, (x)?

- c. The general formula for interest compounded yearly is $A = P(1 + r)^t$ where A stands for the total amount of money in the account, P represents the original deposit (called the principal), r stands for the rate (expressed as a decimal), and t stands for the number of years that have elapsed. Identify the principal, rate, and time in Questions 2a and 2b.

Compound Buck\$ (cont.)

Directions: Answer the following questions using the TI-Nspire handheld.

- 3.** Interest can be compounded for other amounts of time. Semi-annual interest is compounded twice a year.

a. If the interest rate were 4%, what would the semi-annual interest rate be?

b. How many times would the interest be compounded in 5 years?

c. Set up a spreadsheet that will compute the amount in an account with an original deposit of \$100. Be sure to include the half years.

d. The general formula for compound interest is $A = P(1 + \frac{r}{n})^{nt}$ where n is the number of times per year the interest is compounded. Write the equation for \$100 at 4% semi-annually. How does this correspond to your spreadsheet?

e. When would the amount in the account exceed \$500?
