Part Three: Spreadsheets

Use the spreadsheet on Google Classroom and follow the directions below.

1. Using your copy of your spreadsheet, enter the total amount that you need to borrow in cell A3 (Principal) and the time of your 10 year loan in cell B3 (t = 10 + number of years attending college). The total amount over the life of the loan should automatically calculate in cell E3. Does this calculation match your answer in part two?

2. Using your copy of your spreadsheet, enter the total amount that you need to borrow in cell A4 (Principle) and the time of your 20 year loan in cell B3 (t = 20 + number of years attending college). Click on cell E3. If you hover your mouse over the bottom right corner of that cell, your cursor should change, and then you can drag that box down. The total amount over the life of the loan should automatically calculate in cell E4. Does this calculation match your answer in part two?

3. Click on cell E3 and examine the formula.

fx | =A3*(1+(D3/C3))^(C3*B3)

	A	B	C	D	E
1	Principle (Amount borrowed)	Time (in years)	Number of times compounded per year	annual interest rate as a decimal	Total amount over the life of the loan
2	P	t	n	r	A
3			12	0.05045	$0.00

   a. What mathematical operation does * stand for?

   b. What mathematical operation does ^ stand for?

   c. What mathematical operation does / stand for?

   d. Which formula is being modeled by the equation in this cell?

4. Create a formula in cell E5 which calculates the difference between cell E4 and E3. Please note that in order to write a formula you must start your formula with =
   a. Copy + paste your formula here:

   b. Does this match your answer from part two question 4g?

5. You'll notice a second tab on the bottom of your screen called "Calculating Monthly Payment". Switch to that tab and fill in your information for cells A3 and C3.
   a. Principle:

    b. Length of Loan (in years):

    c. Click on cell D3 and examine the formula. What is this formula doing?

    d. Click on cell E3 and examine the formula. What is this formula doing?

6. Using the information given below, write a formula in cell F3 to calculate your monthly payment of your 10-year loan.

First, you must define some variables to make the formula easier to set up:
- **P** = principal, the initial amount of the loan
- **I** = the annual interest rate (from 1 to 100 percent)
- **L** = length, the length (in years) of the loan, or at least the length over which the loan is amortized

The following assumes a typical conventional loan where the interest is compounded monthly. Two more variables make the calculations easier:
- **J** = monthly interest in decimal form = I / (12 x 100)
- **N** = number of months over which loan is amortized = L x 12

The monthly payment (**M**) formula is:

$$M = P \times \frac{J}{1 - (1+J)^{\wedge} -N}$$

Copy + paste your formula here:
(Please note: your formula should be based on cells, not specific numbers, so that it automatically calculates based on the values that you type into each cell)

    a. What is your monthly payment for your 10-year loan?

7. In row 4, fill out the information for your 20-year loan:
    a. Principle:

    b. Length of Loan (in years):

    c. Click on cell D3 and hover your cursor over the bottom right corner until it changes. Drag this down to cell D4 in order to add the formula to this cell. What is your Monthly interest as a decimal?

    d. Click on cell E3 and hover your cursor over the bottom right corner until it changes. Drag this down to cell E4 in order to add the formula to this cell. What is the length of the loan in months?

    e. Click on cell F3 and hover your cursor over the bottom right corner until it changes. Drag this down to cell F4 in order to add the formula to this cell. What is the Monthly payment of your 20-year loan?

8. Reflection:

    a. After calculating your monthly payments, do you think you would rather take out a 10-year or a 20-year loan? Why?

    b. Now that you've done this project, what have you learned about student loans?

    c. What surprised you?

    d. What question(s) do you still have about student loans and finances?