Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**PRECALCULUS PROJECT**

**EXPONENTIAL EQUATIONS AND FINANCE**

1. At the beginning of your freshman year of college, you buy a pizza for $25 and charge it to your credit card. The credit card charges 18% interest compounded continuously.

How much money do you owe when you graduate from college after five years?

Let’s say you forget about your credit card bill and decide to pay it off when you retire. How much money do you owe after 40 years?

2. After you get your first “real job”, you decide to buy a new car. You decide on a new 2016 Honda Accord for $22,225. The financing the dealer offers you is for $471 per month for five years. What is the total amount that you will have paid for your car?

How much of this amount is interest?

3. A new SUV that sold for $30,788 has a book value of $24,000 after 2 years. Find an exponential depreciation model for the SUV.

What will be the value of this SUV after 5 years?

4. You want to start saving money to use as a down payment on a house. You

decide to put $200 each month into a savings account that pays 3% interest.

The formula for this type of account is: 

Where *A* = final amount, *P* = amount deposited each month, *r* = interest rate, and *n* = number of months.

How much money is in this account after one year?

How much money is in this account after five years?

How long will it be until you have saved $25,000?

5. After you get your first job, you start to save money for retirement (it’s never too early to start). The formula for this type of account is the same as the one used in problem #4.

If you start early and save $100 per month in an account with an interest rate of 8%, what is the total amount after 40 years?

If you start later in life and save $200 per month in an account with an interest rate of 8%, what is the total amount after 20 years?

Compare the answers to the two questions above. Write what you should do to save money for retirement.

6. After a few more years, you decide to buy a house. The house you select has a price of $250,000. You have saved $25,000 to use as a down payment.

The formula for monthly payments is 

Where *P* = monthly payment, *L* = loan amount, *r* = interest rate, and *n* = number of months.

If you get a 30 year loan with an interest rate of 7%, what is your monthly payment?

After 30 years, what is the total amount you will have paid?

How much of this amount is interest?

If you get a 30 year loan with an interest rate of 6%, what is your monthly payment?

After 30 years, what is the total amount you will have paid?

How much of this amount is interest?

If you get a 20 year loan with an interest rate of 6%, what is your monthly payment?

After 20 years, what is the total amount you will have paid?

How much of this amount is interest?

7. Research the cost of some item you’d like to buy and a credit card rate.

What are you buying?

What is the cost?

Where did you find this price?

What is the credit card rate?

What kind of credit card is it?

Where did you find this credit card rate?

Use the above cost and credit card rate to find out how much you would owe after five years.

Do you think that you’ll still be using this item after five years? Explain.

8. Research the cost of a new car.

What kind of car are you getting?

What is the cost?

Where did you find this car price?

Use the formula in problem #6 to find the monthly payment for a five year loan at 6% interest.

What is the total amount you will have paid for this car?

How much of this is interest?

9. Research the value of a two year old model of the same car you bought in problem #8.

What is the value of this car after two years?

Where did you find this information?

Write an exponential depreciation model for the value of this car.

What will be the value of this car after five years (when you’re done paying it off)?

10. You want to start saving money. Realistically, how much money could you save each month right now? Write this amount here and in the first three rows of the table on the next page.

Research the interest rate for a savings account at a bank. What is the interest rate? Write this rate in the table on the next page.

What bank is this at?

Where did you find this information?

Research the interest rate for a Certificate of Deposit (CD). What is the interest rate? Write this rate in the table on the next page.

What bank is this at?

Where did you find this information?

Historically, the long-term interest rate paid on money invested in the stock market is about 8%.

Complete the table below using the interest rates you have found.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Type of account | Interest rate | Amount invested monthly | Time (years) | Final amount |
| Savings |  |  | 10 |  |
| CD |  |  | 10 |  |
| Stock market | .08 |  | 10 |  |
| Savings |  | 100 | 10 |  |
| CD |  | 100 | 10 |  |
| Stock market | .08 | 100 | 10 |  |
| Savings |  | 200 | 10 |  |
| CD |  | 200 | 10 |  |
| Stock market | .08 | 200 | 10 |  |
| Savings |  | 200 | 40 |  |
| CD |  | 200 | 40 |  |
| Stock market | .08 | 200 | 40 |  |

If you saved $200 each month at a rate of 8%, how long would it take you to have $1,000,000?

11. Research the cost of buying a house and the mortgage interest rate.

What is the cost?

How many bedrooms and bathrooms does this house have?

Where did you find this information?

What is the interest rate for a 30 year fixed loan?

Where did you find this information?

Calculate the monthly payment for this house.

After 30 years, what is the total amount you will have paid?

How much of this amount is interest?

12. Please write a paragraph about what you have learned in this project.