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MATH 135-05

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Third Written Paper/Project

This paper will discuss and analyze how to use and make an Amortization table/schedule. Using Excel we will choose two objects, object A and object B, and determine the loan amounts needed for each in order to be able to afford them. After each individual loan amount is determined, we will then combine the monthly payments of each and determine whether or not it would be more financially responsible to combine the costs of the objects and apply for one singular loan.

A) Object A is my dream car, a 2019 Jeep Grand Cherokee Overland. The total price of this object is \$43,990. I will be seeking a loan amount from the bank of \$44,000. Over the next 5 years I will repay this loan with an annual percentage rate of 9%. Object B is a jet ski I would love to own and the total price is \$16,099. I would need a loan of \$15,000 from the bank to purchase this jet ski. Over the next 5 years I will repay with an annual percentage rate of 9% also.

B) Using the monthly payment formula and plugging in my amount borrowed to be \$44,000 and my APR of 9%, the monthly payment I will be responsible for is \$913.37. Using the same formula as object A, for object B the monthly payment would be \$311.38 for 60 months.

C) In order to determine the amount of money I would need to repay each month I used the monthly payment formula which states:

$$\text{Monthly Payment} = \frac{\text{Amount Borrowed} \times r(1+r)^t}{((1+r)^t - 1)}$$

$$r = \frac{.09}{12}$$

$$r = .0075$$

$$t = 12 \text{ months} \times 5 \text{ years} \quad t = 60$$

After using this formula and plugging in my own numbers for object B, I calculated that applying for a loan of \$44,000 with an APR of 9% I will need to make a monthly payment of \$913.37 in order to be able to repay the amount of money I borrowed from the bank in a 5 year period. Object B uses the same formula but a different amount for the amount borrowed. I found that when I plug in the amount of the \$15,000 loan and the APR of 9%, I would be paying back the bank monthly \$311.38 for 5 years.

D) An amortization table/schedule provides information concerning the number of payments made, the amount of each payment going towards interest, the balance owed, and the outstanding balance during the process of paying off a debt. Although a portion of each payment is applied to both the principal balance and interest of the loan, the specific amount applied to the principal each time varies, with the remainder being applied to the interest. An amortization schedule displays the exact amount that is put towards interest, in addition to the amount put towards the principal balance, of each payment. Initially, a large amount of each payment is dedicated to interest. As the loan matures, larger portions go towards paying off the principal balance.

E) Equity is the amount of money that I have paid from the principal amount at any given time. After making payments on item A for 6 months, the equity I have in the Jeep Grand Cherokee is \$3,566.51. After making payments on item B for 6 months, the equity I have on the jet ski is \$1,215.85. The Jeep has a greater equity because the item is more expensive and requires a larger loan taken out.

F) Amount of money applied to interest in the first payment for object A is \$330. The amount of money that was applied to the balance owed from the first monthly payment of object A was \$583.37. The amount of money applied to interest for object B is \$112.50 from the first monthly payment. The amount of money applied to interest owed from the first payment from object B is \$198.88. The Jeep has a larger amount of money applied to interest since the amount of money we have to borrow is larger. The Jeep also has a larger amount owed from the first payment since it has a larger payment each month.

G) Combining the two total loan amounts, we get a total balance of \$59,000. Taking into account the same APR of 9% and applying these numbers to the monthly payment formula, we see that if the two loans were combined the monthly payments over five years would be \$1,224.75. This amount is the same as the sum of the monthly payments if the loans were to be kept separate. This is because the amount of each object remains the same, as does the APR. If the APR were to change then the monthly payment on one loan would be smaller or larger depending if the change was positive or negative.

H) If I found out that I could only afford to pay half of my current monthly payment, $\$913.37 \div 2 = \456.69 I would first plug this monthly amount into the amount borrowed formula to see what price range I could afford to shop in.

$$\text{Amount Borrowed} = \frac{\text{Monthly Payment} \times ((1+r)^t - 1)}{(r \times (1+r)^t)}$$

$$\text{Amount Borrowed} = \frac{456.69 \times ((1+.0075)^{60} - 1)}{(.0075 \times (1+.0075)^{60})} = 22,000$$

From using this formula I found that a monthly payment of \$456.69 would allow me to apply for a \$22,000 loan from the bank while still paying the total back in 5 years at an APR of 9%.

I.) If the monthly payment for object B was twice as much as I could afford I would only be able to afford half, which would make the monthly payment \$155.69. I would use the same formula as I did for object A. I would plug in 155.69 in the monthly payment.

$$\text{Amount Borrowed} = \frac{155.69 \times ((1 + 0.0075)^{60} - 1)}{(0.0075 \times (1 + 0.0075)^{60})} = 7,500.11$$

I would apply for a loan of \$7,500 that I would still be able to pay back at an APR of 9% after 5 years

An amortization schedule/table is helpful to people who plan to financially invest in an item. It allows smart financial planning and gives the opportunity to look at how much money you will need to pay each month. Not only does it show how much money you are responsible to pay, but it shows exactly where your money is going. Having The skill of knowing how to prepare an amortization table will aid us well in future financial investments we may make.

Object B

Payment Number	Payment	Applied to interest	Applied to balance owed	Outstanding Balance
1	\$311.38	\$112.50	\$198.88	\$14,801.12
2	\$311.38	\$111.01	\$200.37	\$14,600.76
3	\$311.38	\$109.51	\$201.87	\$14,398.89
4	\$311.38	\$107.99	\$203.38	\$14,195.50
5	\$311.38	\$106.47	\$204.91	\$13,990.60
6	\$311.38	\$104.93	\$206.45	\$13,784.15