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Math Paper 3

When it's time to start thinking about making big purchases for large items, sometimes taking out loans is necessary, especially when trying to purchase two "big ticket" items. Taking out a loan or two entails calculating a few different aspects in order to be fully prepared to take on these financial burdens. Making an agreement with a bank when they authorize a loan means that not only will the consumer have to pay back the loan as a whole, but also pay back the interest that the loan accumulates during its time. For these items, the loans will be active for five years, with an APR of 9%, as set by the bank's terms. One great way to be sure you are financially capable of handling these loans is to make an amortization table. This table will physically lay out each monthly payment that will be owed as well as a great way to schedule yourself out for the full five years.

The two objects we chose to purchase are a car and a house. Object A is a 2019 Volkswagen Beetle that costs $20,895.00. The loan we took out is also $20.895.00, so the same amount as the cost of the car. Object B is a house in California that costs $440,000.00, which is the average cost of a house in California. The amount of the loan is $440,000.00, so again equal to the amount of the object. We chose to take out a loan that is equal to the cost of the object in order to make sure that we would be able to afford the object.

In order to determine how much we would need to pay each month for the loan, we used the monthly payment formula. The monthly payment formula is Monthly Payment=amount borrowed x r(1+r)^t / ((1+r)^t -1). The monthly payment for the car is $433.75 each month. The monthly payment for object B, or the house, is $9133.68. For the monthly payment formula for object A, the amount borrowed is $20,895, the value for r is .0075, which was found by dividing the APR in decimal form by 12 or .09/12. The value for t is 60 because that is the amount of months in five years. For object B the amount borrowed is $440,000, the value of r is .0075, and the value for t is again 60 months.

An amortization table shows the number of payments made, the payment amount, the amount of applied interest, the amount applied to the balance owed, and the amount of the outstanding balance. The amortization table is used for installment loans to show the outstanding balance after a certain payment. Equity is defined as the part of the principle that you have already paid. The equity of the objects after 6 monthly payments is the amount we have paid for the object after 6 months. For object A, the equity after 6 monthly payments is $1,693.71. The equity after 6 monthly payments for the house is $35,664.97. We have a greater equity in object B because object B costs more than object A, therefore, we have had to pay more for object B than object A.

Since the two objects cost different amounts, the amount we pay and the amount applied to interest vary between the objects. The loan for object B has the largest amount applied to interest for the first payment. The amount applied to the interest is $3,300 for the first month. This amount is larger than the amount applied to interest for object A even though they have the same APR and term because the cost of object B is greater than the cost of object A. The amount applied to the balanced owed is also greater for object B. The amount applied to the balance owed for object B is $5,833.68 for the first month. This amount is larger than for object A because the outstanding balance, payment, and applied interest are all higher than the amounts for object A.

We have two separate loans, one for the car and one for the house. The monthly payment for the car is $433.75 while the monthly payment for the house is $9133.68. If we combined these two loans and considered them one loan, the monthly payment would be about the same. Just adding the two separate monthly payments will equal a total monthly payment of $9567.43. If the loan amounts are added together, which would be $460,895, the monthly payment would be $9567.43. This is because both loans have the same APR and the same term of 5 years. Therefore, adding them together would not change the APR or the term, it would only change the amount of the monthly payment, amount of interest applied, and the amount applied to the owed balance.

Sometimes, the monthly payment for a loan is too high for one to afford. In this case, the amount borrowed would need to be changed. If the monthly payment for object A and B were twice as much as we could afford, we would need to adjust the amount borrowed by about half. For object A, we took out a loan of $20,895 which gave us a monthly payment of $433.75. If we wanted to pay a monthly payment that is half this amount, so $216.88, we could take out a loan of $10,447.84. For object B, we had a loan of $440,000 which resulted in a monthly payment of $9133.68. If we could only pay half this amount, so $4566.84, we would have to take out a loan of $220,000.09. To find the amount we would be able to borrow in order to have a certain monthly payment, the amount borrowed formula is used. This formula is amount borrowed=monthly payment x ((1+r)^t -1) / (r x (1+r)^t). The value for r and t would stay the same as the monthly payment formula discussed above.

All in all, when it is time to take out loans to make big purchases such as these (a car or a house), looking into the specifics of the bank's terms as well as many different options to take for the loans is the best way to be prepared. Computing varying ways to go about taking out a loan and different payment plans is also very important. If the consumer is able to take all of the information, like the price of the items they are purchasing, the amount of the loan they are taking out, the APR as set by the bank, the amount of interest the loan will accumulate as a result of the APR, and a personalized amortization chart then they have all the right tools to set them up for success when paying back their loans!

Amortization Table Item A				
Payment Number	Payment	Applied to Interest	Applied to Balance Owed	Outstanding Balance
				$20,895.00
1	$433.75	$156.71	277.04	$20,617.96
2	$433.75	154.63	279.12	20,338.84
3	$433.75	152.54	281.21	$20,057.63
4	$433.75	150.43	283.32	$19,774.31
5	$433.75	148.31	285.44	$19,488.87
6	$433.75	146.17	287.58	$19,201.29
Amortization Table Item B				
Payment Number	Payment	Applied to Interest	Applied to Balance Owed	Outstanding Balance
				$440,000.00
1	9,133.68	3300	5833.68	434,166.32
2	9,133.68	3256.25	5877.43	428,288.89
3	9,133.68	3212.16	5921.52	422,367.37
4	9,133.68	3167.76	5965.92	416,401.45
5	9,133.68	3123.01	6010.67	410,390.78
6	9,133.68	3077.93	6055.75	404,335.03