To set the scenario for the project, imagine that after several years of hard work you have graduated from Bryant & Stratton College and you have just gotten your dream job. Now that you are earning a nice salary, you decide you want to buy a new car. You decide you can afford to make a down payment and then a monthly payment of $500 per month, but you are not sure how expensive a car you can afford. You visit the car dealer, and the salesman shows you a $15,000 car, a $30,000 car, and a $45,000 car. He tells you that if you can make a down payment of 20% and get a car loan for the remaining 80%, he is sure you can afford any of the three cars. You know this is only true if you can get a loan for a sufficient number of years.

 You go home and research car loan interest rates. You visit <http://www.bankrate.com/auto.aspx>, and you research the lowest car loan interest rate offered by a specific bank for a 36-month new car loan, a 48-month new car loan, a 60-month new car loan, and a 72-month car loan. To ensure that all students are using the same data, please enter Buffalo, New York as the location. Assume that the rate is compounded monthly.

Use the formula given in this project and the car loan rate you have found for the Buffalo, New York location. If there is no 72-month loan at the time you are assigned this project, then skip this requirement. If the 72-month loan exists, you will be expected to calculate it. Show all your calculations and attach your answers to the following three questions in paragraph form according to the outline:

* Number your paragraph answers per the number of the question below. Ensure that all paragraphs are double spaced.
* You need one-inch margins, Times New Roman, 12 point font.

1. a. What is the shortest loan (36 months, 48 months, 60 months or 72 months) that has a monthly payment within your $500 budget that will allow you to buy the $15,000 car?

1. b. Whether you can afford it or not, how much is the monthly payment for a $15,000 car for a 36-month loan? (Tip: Don’t forget about the 20% down payment in your calculations).

2. a. What is the shortest loan (36 months, 48 months, 60 months or 72 months) that has a monthly payment within your $500 budget that will allow you to buy the $30,000 car?

2. b. Whether you can afford it or not, how much is the monthly payment for a $30,000 car for a 36-month loan? (Tip: Don’t forget about the 20% down payment in your calculations).

3. a. What is the shortest loan (36 months, 48 months, 60 months or 72 months) that has a monthly payment within your $500 budget that will allow you to buy the $45,000 car?

3. b. Whether you can afford it or not, how much is the monthly payment for a $45,000 car for a 36-month loan? (Tip: Don’t forget about the 20% down payment in your calculations).

Car loans can be calculated using either simple interest or compound interest. In this problem, you are expected to use the compound interest formula given below.

Please use this formula to find the monthly payment:

## *M* = *P* [ *i*(1 + *i*)n ] / [ (1 + *i*)*n* - 1]

M is the monthly payment and *i* = *r*/12. Note that in the formula above, *P* [ *i*(1 + *i*)n ] is the numerator and [ (1 + *i*)*n* - 1] is the denominator.

The following is an example in which the formula above is used to calculate a home mortgage. While you are buying a car instead of a house, the computations are done in the same way.

The formula for the project was taken from [www.ifitbreaks.com/interest.htm](http://www.ifitbreaks.com/interest.htm)

|  |  |
| --- | --- |
| Monthly Interest (i)$$i=\frac{rate}{12}$$$$i=\frac{0.05}{12}=0.0042$$ | Number of Payments (n)$$n=12 months×number of years$$$$n=12×15=180 payments$$ |
| $$(1+i)^{n}$$$$=\left(1+0.0042\right)^{180}$$$$=1.0042^{180}$$$$=2.1264$$$$i(1+i)^{n}$$$$=0.0042×2.1264$$$$=0.0089$$ | Principle (P)$$P=100,000$$$$P[i\left(1+i\right)^{n}]$$$$=100000×0.0089$$$$=890$$This is the numerator. | $$[(1+i)^{n}-1]$$$$=2.1264-1$$$$=1.1264$$This is the denominator. | Monthly Payment (M)$$M=\frac{numerator}{denominator}$$$$M=\frac{890}{1.1264}$$$$=790.13$$The monthly payment is $790.13. |

All of the rounding down I did makes very little difference on the monthly payment compared with keeping all the digits the calculator can handle.

To help you in your computations, you will need to make many copies of this table (one for each car, interest rate and term). Complete all tables and include only the three that show the shortest term each of the three cars will fit into your $500 budget.

|  |  |  |  |
| --- | --- | --- | --- |
| Cost | Rate/Monthly Interestrate=\_\_\_\_\_\_\_% from Bankrate.comMonthly Interest (i)$$i=\frac{rate}{12}$$$$i=$$ | Term (n) is number of payments. $n=$\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 20% Down Payment=$\_\_\_\_\_\_\_\_\_\_\_\_\_Amount Borrowed (P)$$P=$$ |
| $$(1+i)^{n}$$$$i(1+i)^{n}$$ | $$P[i(1+i)^{n}]$$This is the numerator. | $$[\left(1+i\right)^{n}-1$$This is the denominator. | Monthly Payment (M)$$M=\frac{numerator}{denominator}$$ |

Submit your three tables and your number, and include your three paragraphs.