Name _____ Mr. Schlansky Date _____ Algebra II



Mortgage Problems

1. Jim is looking to buy a vacation home for \$172,600 near his favorite southern beach. The formula to compute a mortgage payment, M, is $M = P \cdot \frac{r(1+r)^N}{(1+r)^N - 1}$ where P is the principal amount of the loan, r is the monthly interest rate, and N is the number of monthly payments. Jim's bank offers a monthly interest rate of 0.305% for a 15-year mortgage. With a \$20,000 down payment, determine Jim's mortgage payment, rounded to the *nearest dollar*.

Algebraically determine and state the down payment, rounded to the *nearest dollar*, that Jim needs to make in order for his mortgage payment to be \$900.

2. Using the formula below, determine the monthly payment on a 5-year car loan with a monthly percentage rate of 0.625% for a car with an original cost of \$21,000 and a \$1000 down payment, to the *nearest cent*.

$$P_n = PMT\left(\frac{1 - (1 + i)^{-n}}{i}\right)$$

 P_n = present amount borrowed n = number of monthly pay periods PMT = monthly payment i = interest rate per month

The affordable monthly payment is \$300 for the same time period. Determine an appropriate down payment, to the *nearest dollar*.

3. Monthly mortgage payments can be found using the formula below:

$$M = \frac{P\left(\frac{r}{12}\right)\left(1 + \frac{r}{12}\right)^n}{\left(1 + \frac{r}{12}\right)^n - 1}$$

M = monthly payment P = amount borrowed r = annual interest rate n = number of monthly payments

The Banks family would like to purchase a home for \$220,000. They qualified for an annual interest rate of 4.8%. If they put make a down payment of \$100,000 and plan to spend 15 years to repay the loan, what will be the monthly payment rounded to the *nearest* cent?

If they want their monthly payment to be \$1500, what would their down payment have to be?

4. Mr. and Mrs. Jenkins just closed on a new home whose purchase price was \$380,000. At the closing, they supplied a down payment of \$76,000. If on the day of the closing the monthly interest rate was .3125%, determine the Jenkins' monthly mortgage payment, to the *nearest cent*, if they were approved for a 30-year loan.

Use the formula $M = P \bullet \frac{r(1+r)^n}{(1+r)^n - 1}$ where M is the mortgage payment, P is the principal amount

of the loan, r is the monthly interest rate, and n is the number of monthly payments.

Algebraically determine and state the down payment, to the *nearest dollar*, Mr. and Mrs. Jenkins would need to initially supply in order to bring their monthly mortgage payment down to \$1200.

5. Malia wants to renovate the kitchen in her house and estimates that it will cost \$39,000 to do so. She plans to make a down payment of \$5,000 and then finance the rest at 0.25% interest per month over a ten-year period.

Use the following formula to determine Malia's monthly payment to the nearest cent.

$$P_n = PMT\left(\frac{1 - (1 + i)^{-n}}{i}\right)$$

 P_n = present amount borrowed n = number of monthly pay periods PMT = monthly payment i = interest rate per month

Malia can reasonably only afford a monthly payment of \$275. What must her down payment be in order to accomplish this monthly payment?

6. Astrid just purchased a new car for \$30,000. She traded in her old car and used the money she received from it to make a \$4,000 down payment on the car. To the *nearest cent*, what will be Astrid's monthly payment on her new car if her loan has an interest rate of 0.05% per month and

the life of the loan is ten years? Use the formula $A = R\left(\frac{1-(1+i)^{-n}}{i}\right)$ where A = present amount

borrowed, R = monthly payment, n = number of monthly pay periods, and I = monthly interest rate.

Astrid knows that she cannot afford a monthly payment of more than \$200 for the same time period. What must her down payment be for her monthly payment to be \$200?

7. The Wells family is looking to purchase a home in a suburb of Rochester with a 30-year mortgage that has an annual interest rate of 3.6%. The house the family wants to purchase is \$152,500 and they will make a \$15,250 down payment and borrow the remainder. Use the formula below to determine their monthly payment, to the *nearest dollar*.

$$M = \frac{P\left(\frac{r}{12}\right)\left(1 + \frac{r}{12}\right)^n}{\left(1 + \frac{r}{12}\right)^n - 1}$$

M = monthly payment P = amount borrowed r = annual interest rate n = total number of monthly payments

8. Monthly mortgage payments can be found using the formula below, where M is the monthly payment, P is the amount borrowed, r is the annual interest rate, and n is the total number of monthly payments. If Adam takes out a 15-year mortgage, borrowing \$240,000 at an annual interest rate of 4.5%, What will his monthly payment be?

$$M = \frac{P\left(\frac{r}{12}\right)\left(1 + \frac{r}{12}\right)^n}{\left(1 + \frac{r}{12}\right)^n - 1}$$

9. Robert is buying a car that costs \$22,000. After a down payment of \$4000, he borrows the remainder from a bank, a six year loan at 6.24% annual interest rate. The following formula can be used to calculate his monthly loan payment. What will Robert's monthly payment be?

$$R = \frac{(P)(i)}{1 - (1 + i)^{-t}}$$

$$R = \text{monthly payment}$$

$$P = \text{loan amount}$$

$$i = \text{monthly interest rate}$$

$$t = \text{time, in months}$$