

Name _____
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Date _____
Algebra II

Mortgage and Annuities

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 no 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 \$1100.

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. 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 20% of the purchase price. If on the day of the closing the annual 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 $M = P \cdot \frac{r(1+r)^n}{(1+r)^n - 1}$ 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.

4. 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 borrow \$120,000 to purchase a home. They qualified for an annual interest rate of 4.8%. If they plan to spend 15 years to repay the loan, what will be the monthly payment rounded to the *nearest cent*?

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 per month at most Malia's parents decide to help her with the cost of her new kitchen. If they give her an *additional* \$5,000 as part of the down payment, will it be enough to bring the monthly payment amount to an affordable amount for Malia? Justify your answer.

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. By how much, to the *nearest dollar*, should she increase her down payment to satisfy this condition?