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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 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 \$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. 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. 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. What would her down payment have to be in order for her monthly payment to be \$275?

5. 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 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  $M = P \cdot \frac{r(1+r)^n}{(1+r)^n - 1}$  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.

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