Equity Assignment - MAT 119

When you finance a purchase using an amortized loan, you slowly pay off this loan over its term. “Equity” is the part of the principal you have already paid, plus the down payment (assuming you have made the minimum monthly payments). The formula for equity is:

\[ \text{Equity} = \text{Original Loan} - \text{Amount you still have to pay on the loan} + \text{down payment} \]

**Example:** The Jones purchase a $120,000 home. They make a down payment of $20,000 and finance the remaining $100,000 through an amortized loan at 7.5% compounded monthly for 30 years. First, find their monthly payment, and second, find their equity after 8 years.

**Solution:** This problem involves a few steps. Find the monthly payment first using the amortized loan formula (Present value \( V = $100,000 \), \( i = .075/12 \), \( n = 30 \times 12 = 360 \)).

(You verify the calculations). Their monthly payment is $699.21.

To calculate the equity after 8 years, we need to look at the loan from the bank's point of view: the loan still has 22 years left on its term. To calculate the amount the Jones still have to pay on the principal we use the Present Value formula again, but now we are computing \( V \) (Note: \( n = 264 \) since 22 years = 264 months)

\[
V = \frac{699.21 \left(1 - (1 + .075/12)^{-264}\right)}{.075/12}
\]

This gives \( V = $90,277.68 \). This is the amount the Jones need to pay on the principal of the loan after 8 years.

Therefore, the equity is:

\[
\text{Equity: } 100,000 - 90,277.68 + 20000 = $29,722.32
\]

Note that the Jones made a $20,000 down payment on the house. Since the equity after 8 years is $29,722.32 it means the Jones paid only $9,722.32 on the principal of the loan.

**Your homework assignment:**

You purchase a house for $200,000. You made a 20% down payment and finance the rest with a 30-year mortgage at 7.75% compounded monthly.

1. Calculate your minimum monthly payment.

2. Create a table and calculate the equity you have on your house after 10 years, after 20 years and after 25 years. Do you notice a trend (How does the equity increase in time)?