Claire takes out a home loan worth $80,000 today. She will repay the loan by making equal payments at the end of each month for the next 20 years. The interest is 9.0% APR compounded monthly.

a.) Determine the size of the level payments.

The scenario describes a stream of $n = 12 \cdot 20 = 240$ payments with periodic interest rate $i = .09/12 = .0075$. We know the present value of the stream to be worth $80,000. So, we have the following:

\[ 80,000 = R \cdot \left( \frac{1 - (1.0075)^{-240}}{.0075} \right) . \]

So,

\[ R = 80,000 \div \left( \frac{1 - (1.0075)^{-240}}{.0075} \right) = \$719.79. \]

b.) Assuming Claire pays off her loan exactly on schedule, how much interest will she have paid?

Claire makes 240 payments of $719.79, which totals to $172,749.60. Of this amount, the first $80,000 is the principal of the loan and the remainder is interest. So, she ended up paying

\[ $172,749.60 - $80,000 = $92,749.60 \] in interest.