Monthly Payment on a Loan - Formula

\[ P \] = the amount borrowed (the \textbf{Principal})
\[ r \] = the \textbf{annual} interest \textbf{rate}
\[ n \] = the \textbf{number of months} of the loan
\[ M \] = the \textbf{monthly payment}

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

To make it easier to enter into your calculator:

\[ M = \left( P \left( 1 + \frac{r}{12} \right)^n \ast \left( \frac{r}{12} \right) \right) / \left( (1 + \frac{r}{12})^n - 1 \right) \]

Example)

Suppose you need to get a loan to buy a used truck. You borrow $7,000 for 4 years at 15\% \text{ annual interest}. Find your monthly payment.

\[ P = \$7,000 \]
\[ r = 15\% = 0.15 \]
\[ n = 4 \times 12 = 48 \]
\[ M = \text{Your monthly payment} \]

\[ M = \left( 7000 \left( 1 + \frac{0.15}{12} \right)^{48} \ast (0.15/12) \right) / \left( (1 + 0.15/12)^{48} - 1 \right) \]
\[ M = $194.82 \]