Formulas for Finance Math

\( m \) = the number of compounding periods per year.
(annually \( m = 1 \), semiannually \( m = 2 \), quarterly \( m = 4 \), monthly \( m = 12 \), daily \( m = 365 \))

\( r \) = the annual interest rate as a decimal. (12\% = 0.12)

\( t \) = the time in years. (6 months = 0.5 years)

### Simple Interest
\( P = \) principal

**Simple Interest**

\[ I = Prt \]

**Future Value**

\[ A = P + Prt \]

**Present Value**

\[ P = \frac{A}{(1 + rt)} \]

### Compound Interest
\( P = \) principal

**Future Value**

\[ A = P \left(1 + \frac{r}{m}\right)^{mt} \]

**Present Value**

\[ P = \frac{A}{\left(1 + \frac{r}{m}\right)^{mt}} \]

**Continuous Compounding**

\( e = 2.71828 \)

\[ A = Pe^{rt} \quad P = Ae^{-rt} \]

### Future Value: Annuities and Sinking Funds
\( FV = \) future value=S, \( PMT = \) payment=R

\[ FV = PMT \left[ \frac{\left(1 + \frac{r}{m}\right)^{mt} - 1} {\left(1 + \frac{r}{m}\right)^{mt} - 1} \right] \]

\[ PMT = FV \left[ \frac{\left(\frac{r}{m}\right)^{mt}} {\left(1 + \frac{r}{m}\right)^{mt} - 1} \right] \]

### Present Value: Annuities and Amortization
\( PV = \) present value=P, \( PMT = \) payment=R

\[ PV = PMT \left[ \frac{1 - \left(1 + \frac{r}{m}\right)^{-mt}} {\left(1 + \frac{r}{m}\right)^{-mt}} \right] \]

\[ PMT = PV \left[ \frac{\left(\frac{r}{m}\right)^{-mt}} {1 - \left(1 + \frac{r}{m}\right)^{-mt}} \right] \]