Simple Interest

$$Interest\ Earned = (Principal) \times (Yearly\ Interest\ Rate) \times (Years)$$

Where the yearly interest rate is in decimal form.

Period Interest Rate (r)

$$r = \frac{APR}{n}$$

Where APR is the annual percentage rate and n is the number of periods per year.
Note: In the above equation, r is a percentage. In the remaining equations, r is represented in decimal form.

Compound Interest

$$Balance\ After\ t\ Periods = (Principal) \times (1 + r)^t$$

APY (Annual Percentage Yield)

$$APY = \left(1 + \frac{APR}{n}\right)^n \quad 1$$

Where APY and APR are in decimal form and n is the number of compounding periods per year.

APY Balance Formula

$$Balance\ After\ y\ Years = (Principal) \times (1 + APY)^y$$

Doubling Time

Exact:

$$\#\ of\ Periods\ to\ Double = \frac{\log 2}{\log\,(\text{Base})} = \frac{\log 2}{\log\,(1 + r)}$$

Estimate (Rule of 72):

$$Estimate\ of\ Doubling\ Time = \frac{72}{APR}$$

NOTE

In all of the above equations, $\boldsymbol{t}$ can be replaced by $\boldsymbol{(n \times y)}$, where $\boldsymbol{n}$ is the number of periods per year and $\boldsymbol{y}$ is the number of years.

In all equations on this handout, $\boldsymbol{r}$ can be replaced by $\frac{\boldsymbol{APR}}{\boldsymbol{n}}$, where $\boldsymbol{n}$ is the number of periods per year.

Monthly Payment

$$Monthly\ Payment = \frac{(Amount\ Borrowed)\ \times\ r(1+r)^t}{((1+r)^t\quad 1)}$$

Where t is the term in months and r is the monthly interest rate, $\frac{APR}{12}$.
Note: This equation can be used to solve for the amount borrowed. For example, if someone knows how much they can afford to pay monthly they can find the amount they would be able to borrow.

Regular Deposits Balance

$$Balance\ After\ t\ Monthly\ Deposits = \frac{(Deposit)\ \times\ ((1+r)^t\quad 1)}{r}$$

Where t is the number of deposits and r is the monthly interest rate.

Deposit Needed Formula

$$Needed\ Monthly\ Deposit = \frac{(Goal)\ \times\ r}{((1+r)^t\quad 1)}$$

Where t is the number of deposits needed to reach your goal and r is the monthly interest rate.

Annuity Yield

$$Monthly\ Annuity\ Yield = \frac{(Nest\ Egg) \times r(1+r)^t}{((1+r)^t\quad 1)}$$

Where r is the monthly rate in decimal form and t is the term in number of months.
Note: This equation can be used to solve for the Nest Egg needed if someone has a monthly annuity yield goal.

Minimum Payment Balance

$$Balance\ After\ t\ Minimum\ Payments = (Initial\ Balance) \times [(1+r)(1\quad m)]^t$$

Where r is the monthly interest rate and m is the minimum monthly payment as a percent of the balance. Both r and m are in decimal form.

Buying Power

$$Percent\ Decrease\ in\ Buying\ Power = \frac{100i}{100+i}$$

Where i is the inflation rate as a **percent**. Normally, the decrease in buying power percentage is rounded to one decimal place.

Inflation

$$Percent\ Rate\ of\ Inflation = \frac{100B}{100\quad B}$$

Where B is the decrease in buying power expressed as a **percent**.