

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

$$A = P \left(1 + \frac{r}{m} \right)^{m \cdot t}$$

Present Value

$$P = \frac{A}{\left(1 + \frac{r}{m} \right)^{m \cdot t}}$$

Continuous Compounding

($e = 2.71828$)

$$A = Pe^{r \cdot t} \quad P = Ae^{-r \cdot t}$$

Future Value: Annuities and Sinking Funds

(FV = future value= S , PMT = payment= R)

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

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

Present Value: Annuities and Amortization

(PV = present value= P , PMT = payment= R)

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

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