

Financial Mathematics

Please Note: $i = \frac{r}{m}$ and $n = mt$ with

t = time in years, r = interest rate expressed as a decimal,

m = number of compoundings per year,

FV = future value, PV = present value, PMT = payment,

and I = interest

Simple Interest: $I = PVrt$ with $FV = PV + I$

Periodic Compounding: $FV = PV (1 + i)^n = PV \left(1 + \frac{r}{m}\right)^{mt}$

Continuous Compounding: $FV = PVe^{rt}$

Effective Rate (APY): $r_E = \left(1 + \frac{r}{m}\right)^m - 1$

Effective Rate (APY) for Continuous Compounding: $r_E = e^r - 1$

Future value of an Ordinary Annuity: $FV = PMT \left[\frac{(1+i)^n - 1}{i} \right]$

Present value of an Ordinary Annuity: $PV = PMT \left[\frac{1 - (1+i)^{-n}}{i} \right]$

Remaining Balance after x payments: $B = PMT \left[\frac{1 - (1+i)^{-(n-x)}}{i} \right]$

Payment amount for n equal periodic payments: $PMT = PV \left[\frac{i}{1 - (1+i)^{-n}} \right]$