Example:

Mortgage Payments

Monthly Payment: $R = P * r / (1 - (1 + r)^{-n})$ where $i = r/12$ and $n = 12*t$

Debt Balance after k payments: $D = P * (1 + r)k - R * ((1 + r)^{k} - 1)/r)$
where P = principal, r = interest rate per period, n = no. of periods, and
k = no. of payments

200000	**P = Principal ($)**
4.8	**i = Annual Rate of Interest (%)**
30	**t = Years**
60	**k = No. of Payments**
Calculate! Clear	
1049.33	**R = Monthly Payment ($)**
183130.29	**D = Debt after K payments ($)**

Accelerating Mortgage Payments

Suppose one decides to pay more than the monthly payment shown above. How many months will it take until the mortgage is paid off?

m= ln[x/(x - Pr)] / ln (1 + r)

200000	**P = Principal ($)**
4.8	**i = Annual Rate of Interest (%)**
1200	**x = Monthly Payment ($)**
Calculate! Clear	
275.2	**m = No. of Payments**

A mortgage of $200,000 is taken for 30 years at the annual rate of 4.8%. The monthly payment is $1,049.33 and after 60 payments (5 years) the balance is down to $181,130.29. If the monthly payments are $1,200 a month from the beginning the loan can be paid off in 275.2 months or 7 years earlier.

$$r = \frac{0.048}{12} = 0.004$$

$$n = 30 * 12 = 360$$

$$R = \frac{200000 * 0.004}{1 - 1.004^{-360}} = \frac{800}{0.762390725} = 1049.33$$

$$n = \frac{\ln[1200/(1200 - 200000 * .004)]}{\ln[1.004]} = \frac{\ln[3]}{\ln[1.004]} = 275.202...$$

$$P = \frac{R}{(1+i)} + \frac{R}{(1+i)^2} + \cdots + \frac{R}{(1+i)^{n-1}} + \frac{R}{(1+i)^n}$$

Return to Financial Calculations