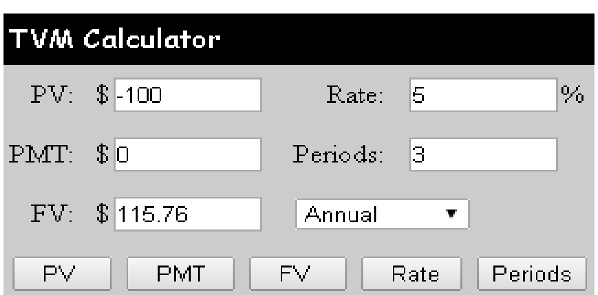
#	TVM	Annual Compounding/Discounting	Non-Annual Compounding/Discounting	Continuous Compounding/Discounting
1	**Future Value of a Lump Sum (FVIF $_{I,N}$)**	$FV_N = PV(1+I)^N$	$FV_N = PV\left(1+\frac{I}{M}\right)^{(M*N)}$	$FV_N = PV(e)^{(I*N)}$
2	**Present Value of a Lump Sum (PVIF $_{I,N}$)**	$PV = \frac{FV_N}{(1+I)^N}$ $PV = FV_N(1+I)^{-N}$	$PV = \frac{FV_N}{\left(1+\frac{I}{M}\right)^{(M*N)}}$ $PV = FV_N\left(1+\frac{I}{M}\right)^{-(M*N)}$	$PV = \frac{FV_N}{(e)^{(I*N)}}$ $PV = FV_N(e)^{-(I*N)}$
3	**Effective Annual Rate Given the Nominal Rate**	$EFF\% = I_{NOM}$	$EFF\% = \left(1+\frac{I_{NOM}}{M}\right)^M - 1$	$EFF\% = (e)^I - 1$
4	**Solve for the Time Period (lump sums)**	$N = \frac{\ln\left(\frac{FV_N}{PV}\right)}{\ln(1+I)}$	$N = \frac{\ln\left(\frac{FV_N}{PV}\right)}{M*\ln\left(1+\frac{I}{M}\right)}$	$N = \frac{\ln\left(\frac{FV_N}{PV}\right)}{I}$
5	**Solve for the Interest Rate (lump sums)**	$I = \left(\frac{FV_N}{PV}\right)^{\left(\frac{1}{N}\right)} - 1$	$I = M\left[\left(\frac{FV_N}{PV}\right)^{\left(\frac{1}{(M*N)}\right)} - 1\right]$	$I = \frac{\ln\left(\frac{FV_N}{PV}\right)}{N}$



Time Value of Money Calculator

This online calculator works similarly to the Time Value of Money functions of the HP 10BII and TI BA II Plus calculators.

http://www.zenwealth.com/BusinessFinanceOnline/TVM/TVMCalculator.html

Legend

I = the nominal, or annual percentage rate (APR)	**N = the number of periods in years**
M = the number of compounding/discounting periods per year	**EFF% = the effective annual rate**
ln = the natural logarithm; the logarithm to the base *e*	***e* = the base of the natural logarithm ≈ 2.71828…**
PMT = the periodic payment or cash flow	**Perpetuity = an infinite annuity**

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#	TVM	Annual Compounding/Discounting	Non-Annual Compounding/Discounting	
6	**Future Value of an Annuity (FVIFA $_{I,N}$)**	$FVA_N = PMT\left[\frac{(1+I)^N - 1}{I}\right]$ $FVA_{due} = FVA_{ordinary}(1+I)$	$FVA_N = PMT\left[\frac{\left(1+\frac{I}{M}\right)^{(M*N)} - 1}{\frac{I}{M}}\right]$ $FVA_{due} = FVA_{ordinary}\left(1+\frac{I}{M}\right)^M$	
7	**Present Value of an Annuity (PVIFA $_{I,N}$)**	$PVA_N = PMT\left[\frac{1-\frac{1}{(1+I)^N}}{I}\right]$ $PVA_N = PMT\left[\frac{1-(1+I)^{-N}}{I}\right]$ $PVA_{due} = PVA_{ordinary}(1+I)$	$PVA_N = PMT\left[\frac{1-\frac{1}{\left(1+\frac{I}{M}\right)^{(M*N)}}}{\frac{I}{M}}\right]$ $PVA_N = PMT\left[\frac{1-\left(1+\frac{I}{M}\right)^{-(M*N)}}{\frac{I}{M}}\right]$ $PVA_{due} = PVA_{ordinary}\left(1+\frac{I}{M}\right)^M$	
8	**Present Value of a Perpetuity**	$PV_{perpetuity} = \frac{PMT}{I}$	$PV_{perpetuity} = \frac{PMT}{\left[\left(1+\frac{I}{M}\right)^M - 1\right]}$	
9	**Present Value of a Growing Annuity**	$PVA_N = \frac{PMT_1}{(I-g)}\left[1-\left(\frac{1+g}{1+I}\right)^N\right]$, where PMT grows at a constant rate g.		
10	**Present Value of a Growing Perpetuity**	$PVA_N = \frac{PMT_1}{(I-g)}$		

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