Time Value of Money Formula Sheet

#	Time Value of Money Formula for	Annual	Intra Year	Continuous
	Future and Present Value of Lump Sum:			
1	Future Value by Sample Interest	$SI_n = P + (P * i * n)$	Nil	Nil
2	Future Value by Compound Interest	$FV_n = PV * (1 + i)^{n}$	$FV_n = PV * (1 + i / m)^{n * m}$	$FV_n = PV * e^{i * n}$
3	Future Value by Factor Formula	$FV_n = PV * (FVIF_{i,\ n})$	$FV_n = PV * (FVIF_{i / m,\ n * m})$	$FV_n = PV * e^{(i/m) * (n*m)}$ #
4	Present Value of Single Cash Flow	$PV_n = FV / (1 + i)^{n}$	$PV_n = FV / (1 + i / m)^{n*m}$	$PV_n = FV / e^{i*n}$
5	Present Value by Factor Formula	$PV_n = FV * (PVIF_{i,\ n})$	$PV_n = FV * (PVIF_{i/m,\ n*m})$	$PV_n = FV / e^{(i/m)* (n*m)}$
	Future and Present Value of Annuity:			
6	Future Value of Constant Cash Flow (CCF) O. Annuity	$FVA_n = CCF [(1 + i)^{n} - 1 / i]$ %	$FVA_n = CCF [(1 + i/m)^{n * m} - 1 / i/m]$	$FVA_n = CCF [(e^{i * n} - 1) / (e^{i} - 1)]$
7	Future Value of Ordinary Annuity by Factor Formula	$FVA_n = CCF * (FVIFA_{i,\ n})$	$FVA_n = CCF * (FVIFA_{i/m,\ n*m})$	$FVA_n = CCF [(e^{(i/m) * n*m} - 1) / (e^{i/m} - 1)]$ ##
8	Future Value of Constant Cash Flow (CCF) Annuity Due	$FVA_{Due} = CCF [(1 + i)^{n} - 1 / i] * (1+i)$ %%	$FVA_{Due} = CCF [(1 + i/m)^{n*m} - 1 / (i/m)] * (1+i/m)$	Nil
9	Future Value of Annuity Due by Factor Formula	$FVA_{Due} = CCF * (FVIFA_{i,\ n}) * (1 + i)$	$FVA_{Due} = CCF * (FVIFA_{i/m,\ n*m}) * (1 + i/m)$	Nil
10	Present Value of Constant Cash Flow (CCF) O. Annuity	$PVA_n = CCF [1-\{1 / (1+i)^{n}\} / i]$ #	$PVA_n = CCF [1-\{1 / (1+i/m)^{n*m}\} / i/m]$	$PVA_n = CCF [\{(1-e)^{-i*n}\} / \{(e^{i} - 1)\}]$
11	Present Value of Ordinary Annuity by Factor Formula	$PVA_n = CCF * (PVIFA_{i,\ n})$	$PVA_n = CCF * (PVIFA_{i/m,\ n*m})$	$PVA_n = CCF [\{(1-e)^{-(i/m) * (n*m)}\} / \{(e^{i/m} - 1)\}]$ ###
12	Present Value of Constant Cash Flow (CCF) Annuity Due	$PVA_{Due} = CCF [1-\{1 / (1+i)^{n}\} / i] * (1+i)$ ##	$PVA_{Due} = CCF [1-\{1 / (1+i/m)^{n*m}\} / i/m] * (1+i/m)$	Nil
13	Present Value of Annuity Due by Factor Formula	$PVA_{Due} = CCF * (PVIFA_{i,\ n}) * (1+i)$	$PVA_{Due} = CCF * (PVIFA_{i/m,\ n*m}) * (1+i/m)$	Nil
	Special Applications:			
14	Perpetuity	$PV_p = CCF / i$	Nil	Nil
15	Effective Annual Rate when Annual Percentage Rate is given	EAR = i	$EAR = (1 + APR / m)^{m} - 1$	Nil
16	Annual Percentage when Effective Annual Rate is given	i = EAR	$i = m [(1 + EAR)^{1/m} - 1]$	Nil
17	Real Interest Rate	RIR = NR - IR	Nil	Nil
18	Rule of Doubling	n = 72 / i	n = 0.35 + 69 / i	Nil
19	The length of time required for a single cash flow to grow to a specified future amount at a given rate of interest	n = {Log (FV / PV)} / {Log (1 + i)}	n = {Log (FV / PV)} / {m * Log (1 + i/m)}	n = 1/i {Log (FV / PV)
20	The simple rate of interest required for a single cash flow to grow to a specified future cash flow.	$i = \{(FV/PV)^{1 / n}\} - 1$	$i = m \{(FV / PV)^{1 / (n * m)}\} - 1$	i = 1/n {In (FV / PV)}
21	The length of time required for a series of constant cash flows to grow to a specific future amount.	n = In {(FVA) (i) / CCF + 1} In (1 + i)	n = In {(i/m) (FVA/CCF) + m/i} / [m * {In (1 + i\m}]	Nil
22	Present value of a finite series of cash flows growing at a constant rate (g) for (n) periods with constant (i).	$PV = \{CCF (1 + g) / (i - g)\} * [1-\{1+g) / (1 + i\}^{n}]$	Nil	Nil

#, ##, ### Continuous Compound and Discounting do not have factor formulas. These line use for Intra Year in case of continuous compounding and discounting.

% $FVAn = CCF (1 + i)^{n-1} + CCF (1 + i)^{n-2} + CCF (1 + i)^{n-3} + \ldots\ldots + CCF (1 + i)^{n-n}$

%% $FVA_{Due} = CCF (1 + i)^{1} + CCF (1 + i)^{2} + CCF (1 + i)^{3} + \ldots\ldots + CCF (1 + i)^{n}$ or FVA_{Due} = Future Value of Ordinary Annuity (1 + i)

$PVA_n = CCF (1/1+i)^{1} + CCF (1/1+i)^{2} + CCF (1/1+i)^{3} + \ldots\ldots + CCF (1/1+i)^{n}$

$PVA_n = CCF (1/1+i)^{n-1} + CCF (1/1+i)^{n-22} + CCF (1/1+i)^{n-3} + \ldots\ldots + CCF (1/1+i)^{n-n}$ or PVA_{Due} = Present Value of Ordinary Annuity (1 + i)

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(Note that our notations are different from those used by text book)