Summary of Discounting Factors

Equation		Description	End of Period Cash Flow Discrete Discounting	End of Period Cash Flow, Continuous Discounting	Continuous or Uniform Cash Flow, Continuous Discounting
To Find	Given				
P	F	Single Payment, Present Worth	$(1+i)^{-n}$	e^{-rn}	
F	P	Single Payment, Compound Amount	$(1+i)^{n}$	e^{rn}	
P	A	Uniform Series, Present Worth	$\frac{(1+i)^n-1}{i(1+i)^n}$	$\frac{e^{rn}-1}{e^{rn}(e^r-1)}$ or $\frac{1-e^{-rn}}{e^r-1}$	$\frac{e^{rn}-1}{re^{rn}}$ or $\frac{1-e^{-rn}}{r}$
A	P	Uniform Series, Capital Recovery	$\frac{i(1+i)^n}{(1+i)^n-1}$	$\frac{e^{rn}(e^r-1)}{e^{rn}-1}$ or $\frac{e^r-1}{1-e^{-rn}}$	$\frac{re^{rn}}{e^{rn}-1}$ or $\frac{r}{1-e^{-rn}}$
F	A	Uniform Series, Compound Amount	$\frac{(1+i)^n-1}{i}$	$\frac{e^{rn}-1}{e^r-1}$	$\frac{e^{rn}-1}{r}$
A	F	Uniform Series, Sinking Fund	$\frac{i}{(1+i)^n-1}$	$\frac{e^r-1}{e^{rn}-1}$	$\frac{r}{e^{rn}-1}$
P	G	Gradient Series, Present Worth	$\frac{[1-(1+ni)(1+i)^{-n}]}{i^2}$	$\frac{e^{rn}-1-n(e^r-1)}{e^{rn}(e^r-1)^2}$	$\frac{e^{rn}-1-n\left(e^r-1\right)}{re^{rn}\left(e^r-1\right)}$
A	G	Gradient Series Conversion to Uniform Series	$\frac{(1+i)^n-(1+ni)}{i[(1+i)^n-1]}$	$\frac{1}{e^r-1}-\frac{n}{e^{rn}-1}$	$\frac{1}{e^r-1}-\frac{n}{e^{rn}-1}$
P	A_1, j or c, $i\neq j$ or $r\neq c$	Geometric Series, Present Worth	$\frac{1-(1+j)^n(1+i)^{-n}}{i-j}$	$\frac{1-e^{(c-r)n}}{e^r-e^c}$	$\frac{e^{(r-c)n}-1}{(r-c)e^{(r-c)n}}$ or $\frac{1-e^{(c-r)n}}{r-c}$
P	A_1, j or c, i=j or r=c		$\frac{n}{(1+i)}$	$\frac{n}{e^r}$	n
F	A_1, j or c, $i\neq j$ or $r\neq c$	Geometric Series, Future Worth	$\frac{(1+i)^n-(1+j)^n}{i-j}$	$\frac{e^{rn}-e^{cn}}{e^r-e^c}$	$\frac{e^{rn}-e^{cn}}{r-c}$
F	A_1, j or c, i=j or r=c		$n(1+i)^{n-1}$	$ne^{r(n-1)}$	ne^{rn}

P = Present Worth, F = Future Worth, A = annual amount, A_1 = annual amount 1st year of geometric series, G = gradient amount, i = discount or interest rate, r = continuous discount or interest rate, j = discrete compounding geometric growth rate, c = continuous compounding geometric growth rate Relationship of i to r and j to c: $i_{effective} = e^r - 1$ and $j_{effective} = e^c - 1$ $r = \ln(1 + i_{effective})$ and $c = \ln(1 + j_{effective})$