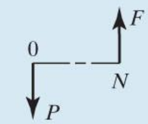
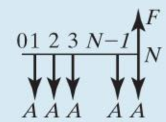
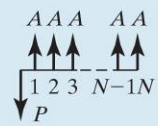
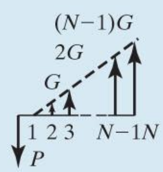
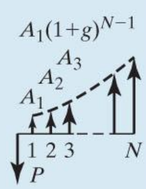
TABLE 3.4 Summary of Discrete Compounding Formulas With Discrete Payments

Flow Type	Factor Notation	Formula	Excel Command	Cash Flow Diagram
SINGLE	Compound amount $(F/P, i, N)$	$F = P(1+i)^N$	$=\mathrm{FV}(i, N, 0, P)$	
	Present worth $(P/F, i, N)$	$P = F(1+i)^{-N}$	$=\mathrm{PV}(i, N, 0, F)$	
EQUAL PAYMENT SERIES	Compound amount $(F/A, i, N)$	$F = A\left[\dfrac{(1+i)^N - 1}{i}\right]$	$=\mathrm{FV}(i, N, A)$	
	Sinking fund $(A/F, i, N)$	$A = F\left[\dfrac{i}{(1+i)^N - 1}\right]$	$=\mathrm{PMT}(i, N, 0, F)$	
	Present worth $(P/A, i, N)$	$P = A\left[\dfrac{(1+i)^N - 1}{i(1+i)^N}\right]$	$=\mathrm{PV}(i, N, A)$	
	Capital recovery $(A/P, i, N)$	$A = P\left[\dfrac{i(1+i)^N}{(1+i)^N - 1}\right]$	$=\mathrm{PMT}(i, N, P)$	
GRADIENT SERIES	Linear gradient Present worth $(P/G, i, N)$	$P = G\left[\dfrac{(1+i)^N - iN - 1}{i^2(1+i)^N}\right]$		
	Annual worth $(A/G, i, N)$	$A = G\left[\dfrac{(1+i)^N - iN - 1}{i\left[(1+i)^N - 1\right]}\right]$		
	Geometric gradient Present worth $(P/A_1, g, i, N)$	$P = \begin{bmatrix} A_1\left[\dfrac{1-(1+g)^N(1+i)^{-N}}{i-g}\right] \\ A_1\left(\dfrac{N}{1+i}\right), (\text{if } i = g) \end{bmatrix}$		

Additional Formula List

Effective Annual Interest Rates

$$i_a = \left(1 + \frac{r}{M}\right)^M - 1 \tag{4.1}$$

Effective Interest Rates per Payment Period

$$i = \left(1 + \frac{r}{M}\right)^C - 1 = \left(1 + \frac{r}{CK}\right)^C - 1 \tag{4.2}$$

Continuous compounding effective interest rate per payment period

$$i = e^{r/K} - 1 \tag{4.3}$$

Continuous compounding annual effective interest

$$i_a = e^r - 1 \tag{4.4}$$

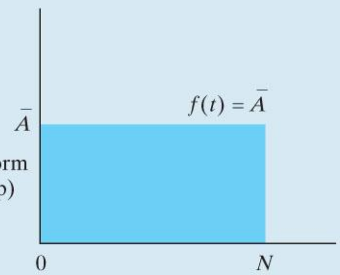
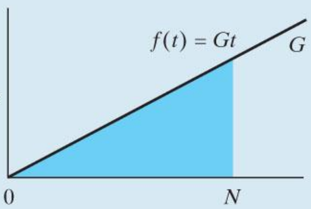
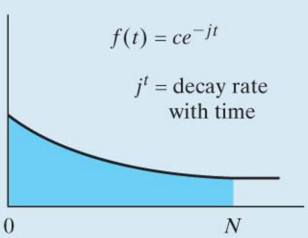
Remaining Balance Method for Debt Management

$$B_n = A\,(P/A, i, N - n) \tag{4.13}$$

$$I_n = (B_{n-1})\, i = A\,(P/A, i, N - n + 1)\, i \tag{4.14}$$

$$PP_n = A\,(P/F, i, N - n + 1) \tag{4.15}$$

TABLE 4.2 Summary of Interest Factors for Typical Continuous Cash Flows With Continuous Compounding

Type of Cash Flow	Cash Flow Function	Parameters Find	Parameters Given	Algebraic Notation	Factor Notation
Uniform (step)		P	$\bar{A}$	$\bar{A}\left[\frac{e^{rN}-1}{re^{rN}}\right]$	$(P/\bar{A}, r, N)$
		$\bar{A}$	P	$P\left[\frac{re^{rN}}{e^{rN}-1}\right]$	$(\bar{A}/P, r, N)$
		F	$\bar{A}$	$\bar{A}\left[\frac{e^{rN}-1}{r}\right]$	$(F/\bar{A}, r, N)$
		$\bar{A}$	F	$F\left[\frac{r}{e^{rN}-1}\right]$	$(\bar{A}/P, r, N)$
Gradient (ramp)		P	G	$\frac{G}{r^2}(1 - e^{-rN}) - \frac{G}{r}(Ne^{-rN})$	
Decay		P	c, j	$\frac{c}{r+j}(1 - e^{-(r+j)N})$	