

Compound Interest & Annuity Flow Chart

Regular Compound Interest

$$S = P(1 + r)^n$$

where r is the periodic rate, n is the total number of periods (see note in legend)

No ↗

Is this an annuity?

Is the same size payment being made every period (e.g., every week, every month, every year)?

Yes ↘

Present Value or Future Value?

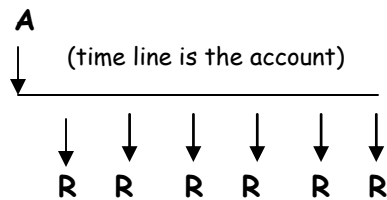
Legend

A = present value amount of the account
 S = future value amount of the account
 P = principal (beginning) amount
 R = periodic payment (must be equal)
 n = total # of compounding periods
 r = periodic interest rate

NOTE: r and n must have matching types (e.g. If n is the total number of months, then r must be the periodic monthly rate.) r is usually given as the nominal rate, sometimes called APR (if the nominal rate is the annual percentage rate); the length of a nominal cycle is usually one year (certain rare businesses have a 2 year nominal cycle). The nominal rate can be adjusted by dividing r by the number of periods in one nominal cycle, thus making r and n match in type.

Present Value

any loan, mortgage, cash-now price, or lottery (think: one amount in, many payments out)

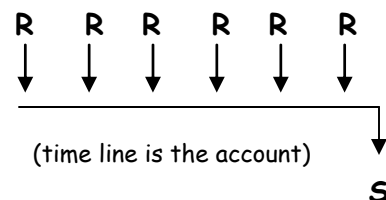


If the payment is at the **end** of each period

If the payment is at the **beginning** of each period

Future Value

savings account, sinking fund, life insurance or pension (think: many payments in, one amount out)



If the payment is at the **end** of each period

If the payment is at the **beginning** of each period

Present Value Ordinary Annuity

$$A = R \left[\frac{1 - (1 + r)^{-n}}{r} \right]$$

(angle notation: $A = R \cdot a_{\overline{n}|r}$)
 where r is the periodic rate, n is the total # of periods (see note in legend)

Present Value Annuity Due

$$A_{due} = R + R \left[\frac{1 - (1 + r)^{-(n-1)}}{r} \right]$$

(angle notation: $A = R + R \cdot a_{\overline{n-1}|r}$)
 where r is the periodic rate, n is the total # of periods (see note in legend)

Future Value Ordinary Annuity

$$S = R \left[\frac{(1 + r)^n - 1}{r} \right]$$

(angle notation: $S = R \cdot s_{\overline{n}|r}$)
 where r is the periodic rate, n is the total # of periods (see note in legend)

Future Value Annuity Due

$$S_{due} = R \left[\frac{(1 + r)^{n+1} - 1}{r} \right] - R$$

(angle notation: $S = R \cdot s_{\overline{n+1}|r} - R$)
 where r is the periodic rate, n is the total # of periods (see note in legend)

