

Basic formulas

Interest paid after interest period

Simple interest (linear function):

$$FV = PV + I$$

$$I = PV * r * t$$

$$FV = PV(1 + r * t)$$

where *FV...Future Value*, *PV...Present Value*, *r...Interest Rate*, *t...Time*, *I...Interest*.

Compound interest (exponential function):

$$FV = PV(1 + r)^t,$$

Note: here the time gives rather # of interest period.

Combined interest (compound + simple):

$$FV = PV(1 + r)^n(1 + r * R),$$

where *n...#number of whole interest periods (integer)* and then the total time is $n + R$, and $R < 1$, since 1 corresponds to one interest period. !!! If the time is not the whole number of interest periods to reach the maximum you should apply the combined interest. The utility can be maximized through FV (more then from compound interest), PV (less then from CI) or the time will be shorter! In the case to find the time, the solution consists in two steps:

1. *simply application of compound interest* : $FV = PV(1 + r)^t$,

if the *t* is not an integer apply the second step:

2. $FV = PV(1 + r)^n(1 + r * R)$,

here the whole number of time will be applied in compound interest (in exponent) and the only unknown remains the *R*, so then solve a simple equation with one unknown (*R*).

Interest paid ahead interest period

Simple interest (linear function):

$$PV = FV(1 - dt)$$

**IT IS POSSIBLE TO DERIVE
ALL UNKNOWNNS FROM GIVEN
EQUATIONS!**