Time Value of Money (TVM)

Basic Idea:

One Dollar today …

…is worth more than one Dollar tomorrow!

…Because you can invest / save your Dollar today and earn a (positive) interest until tomorrow!

Future Value (FV) - Compounding

Examples:

You save **100** USD **for one year** at an interest rate of **3%**.
You save **100** USD for **three years** at an interest rate of **3%** p.a.

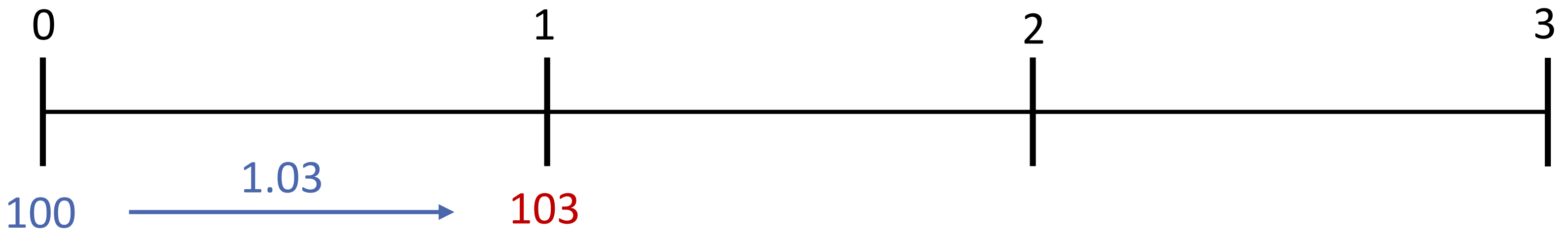
Formula:

$$FV = PV(1 + r)^n$$

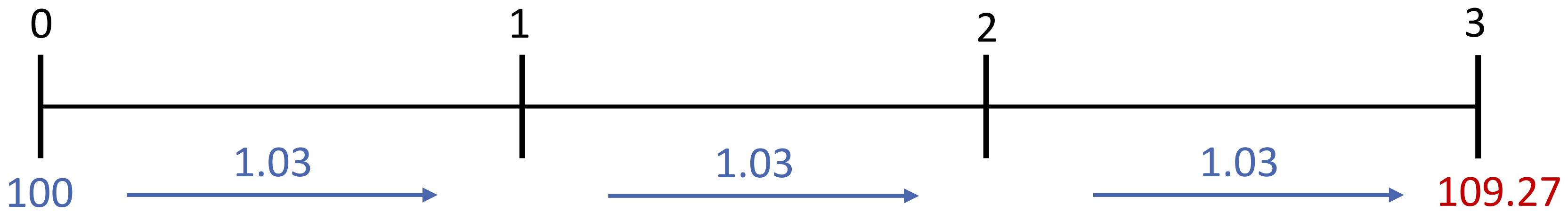
FV: Future Value
PV: Present Value (today)
r: Interest Rate (per period)
n: number of periods

Compounding - Solutions

$$103 = 100(1 + 0.03)^1$$



$$109.27 = 100(1 + 0.03)^3$$



Present Value (FV) - Discounting

Examples:

How many USD to save today at an interest rate of **4.5%** p.a. to get **110** USD in **one year**?
How many USD to save today at an interest rate of **4.5%** p.a. to get **110** USD in **three years**?

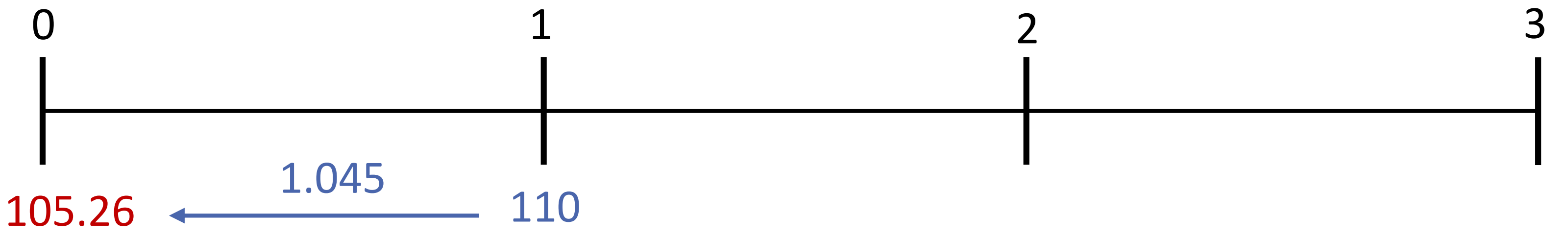
Formula:

$$PV = \frac{FV}{(1+r)^n}$$

FV: Future Value
PV: Present Value (today)
r: Interest Rate (per period)
n: number of periods

Compounding - Solutions

$$105.26 = \frac{110}{(1 + 0.045)^1}$$



$$96.39 = \frac{110}{(1 + 0.045)^3}$$