

② Formulas of Simple Interests and Compound Interests

P : Principal amount of money invested.

r : Interest rate.

t : time (year after the investment)

A : Amount of money after t (years)

① Simple Interest

$$A = P(1 + rt) \quad [\text{linear growth}]$$

② Compound Interest (once a year)

$$A = P(1 + r)^t \quad [\text{exponential growth}]$$

③ compound n times a year

$n = 12$ (compound monthly)

$n = 4$ (quarterly)

$n = 365$ (daily)

and so on

$$A = P \cdot \left(1 + \frac{r}{n}\right)^{nt}$$

when $n \rightarrow \infty$ (compound infinitely many times)

$$P \cdot \left(1 + \frac{r}{n}\right)^{nt} \longrightarrow P e^{rt}$$

This is continuous compound:

$$A = P e^{rt}$$