Engineering Economy

Chapter 4: Simple vs Compound Interest

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Simple interest is used infrequently

When the total interest earned or charged is linearly proportional to the initial amount of the loan (principal), the interest rate, and the number of interest periods, the interest and interest rate are said to be *simple*.

Computation of simple interest

The total interest, I, earned or paid may be computed using the formula below.

$$I = (P)(N)(i)$$

P = principal amount lent or borrowed

N = number of interest periods (e.g., years)

i = interest rate per interest period

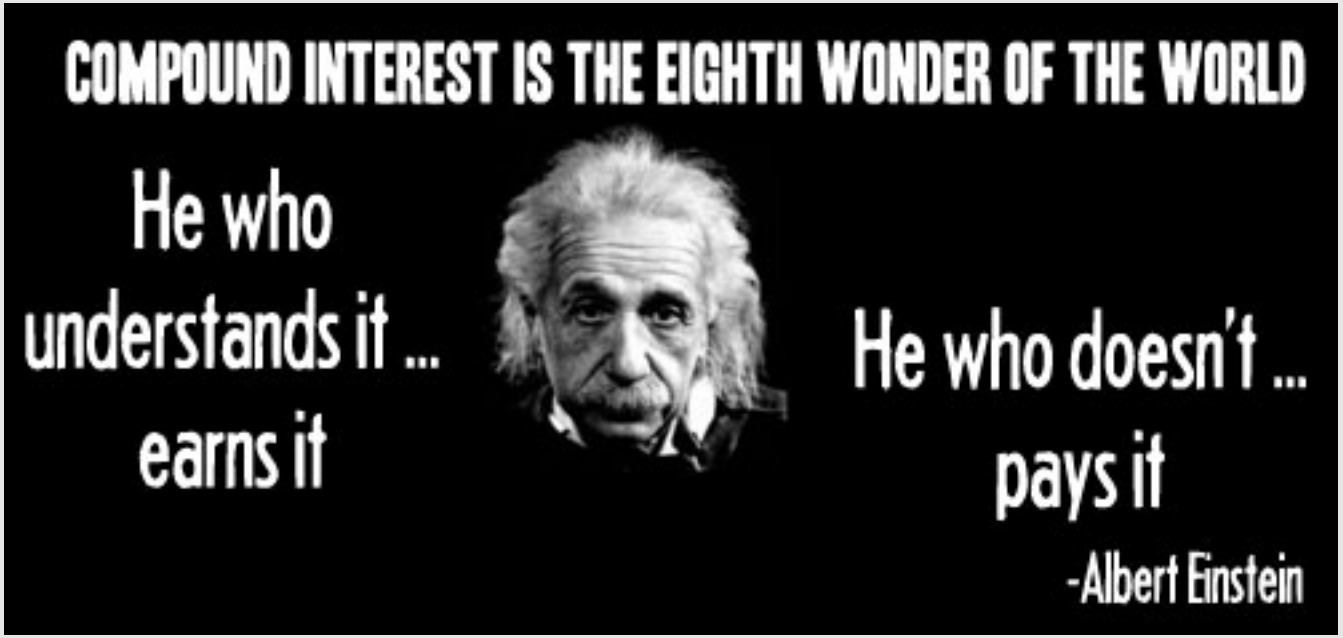
The total amount repaid at the end of N interest periods is $P + I$.

If $1,000 were loaned for three years at a simple interest rate of 10% per year, the interest earned would be

$$I = \$1{,}000 \times 3 \times 0.10 = \$300$$

So, the total amount repaid at the end of three years would be the original amount ($1,000) plus the interest ($300), or $1,300.

Compound Interest



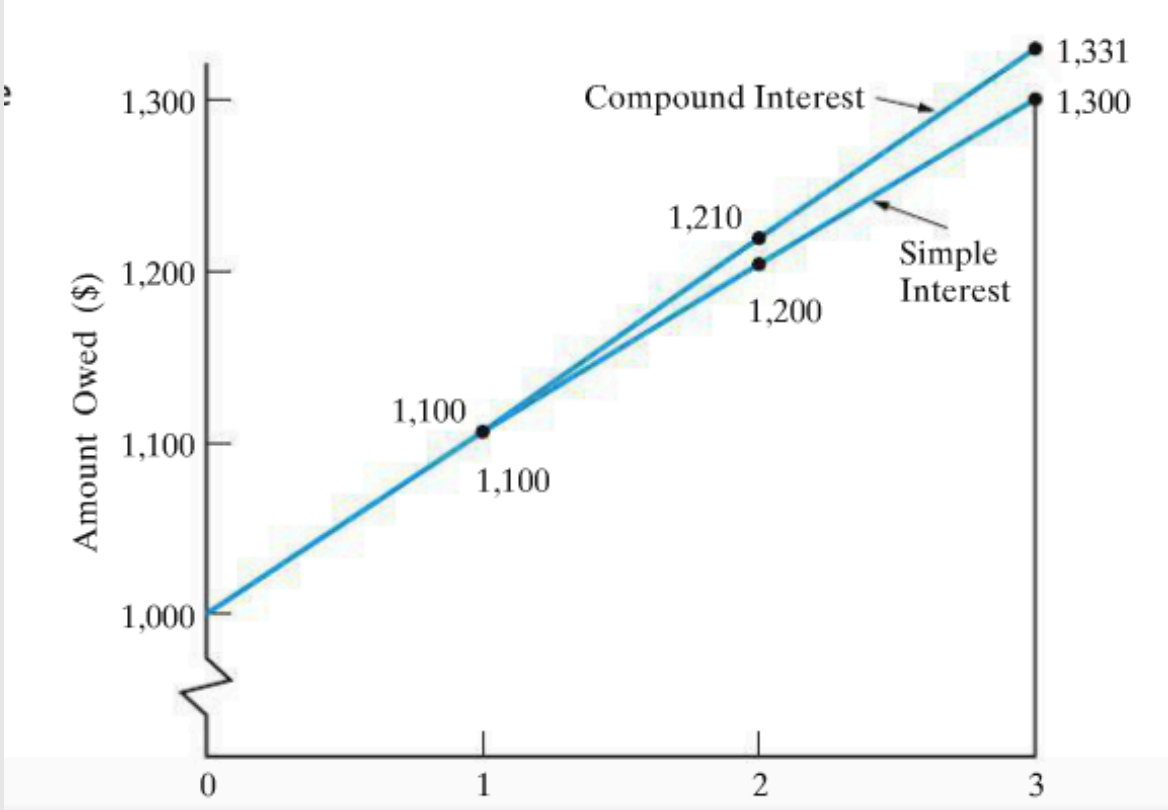
http://www.savethestudent.org/money/15-money-lessons.html

Compound interest reflects both the remaining principal and any accumulated interest. For $1,000 at 10%…

Period	(1) Amount owed at beginning of period	(2)=(1)x10% Interest amount for period	(3)=(1)+(2) Amount owed at end of period
1	$1,000	$100	$1,100
2	$1,100	$110	$1,210
3	$1,210	$121	$1,331

Compound interest is commonly used in personal and professional financial transactions.

Simple vs. Compound

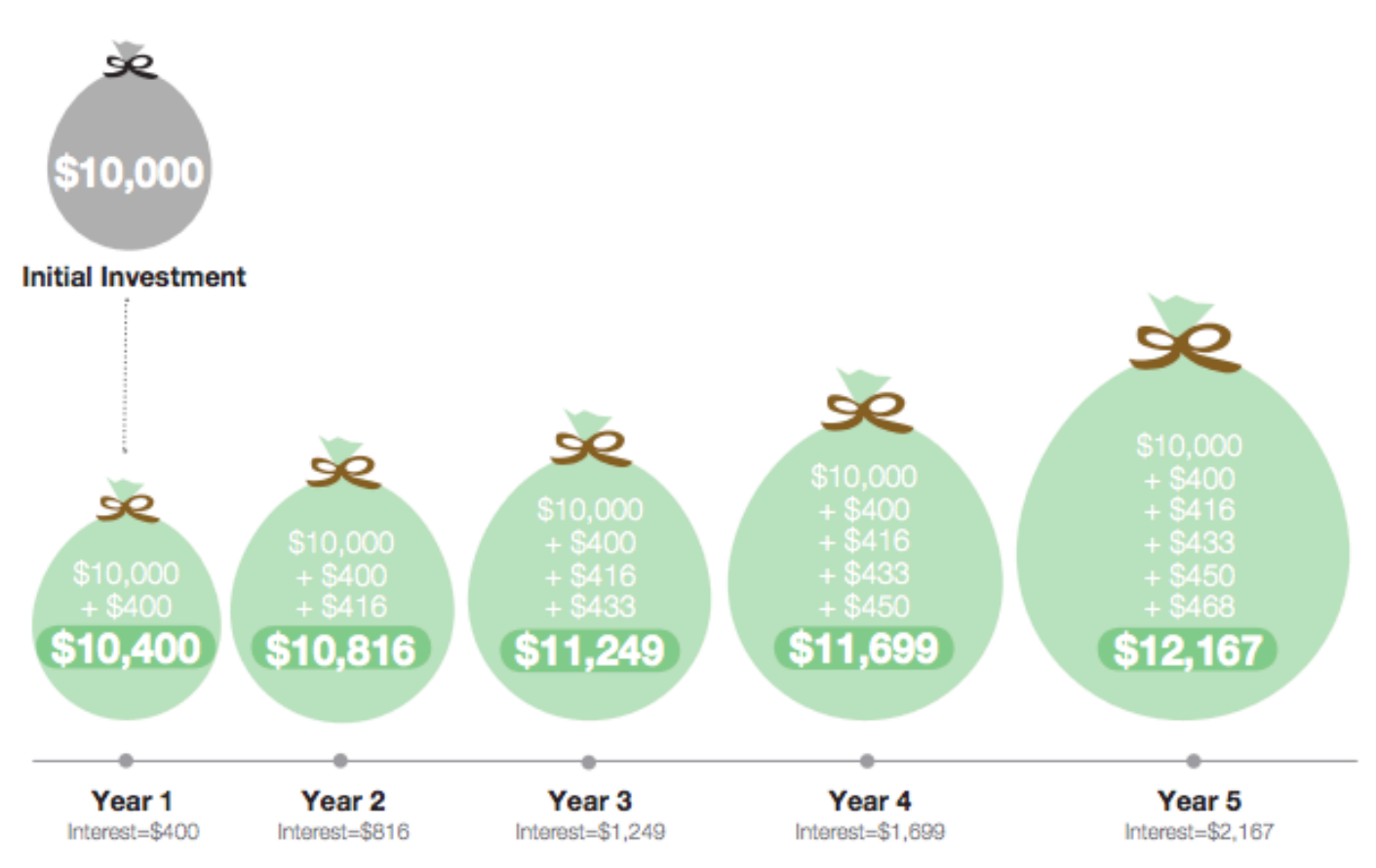


Simple

I = (P)(N)(*i*)

I = $1,000 x 3 x 0.10 = $300

Compound Interest



POWER of Compound Interest & Investing

Coffee Price	Days per week	Yearly Cost	Rate of Return	Age now	Retirement	N	Future Value
$ 5.00	5	$ 1,300.00	10%	20	65	45	$934,576.29

1 coffee / weekday $5.00
Now until retirement…

$934,576

Image:starbucks.com

POWER of Compound Interest & Investing

Average cc balance?

$7,221

Invest this amount ONE TIME
At age 30… value at retirement?

$202,927

Image: dailyfinance.com

POWER of Compound Interest & Investing

Average new car payment?

$530

Invest from age 20 – 60?

$2,814,888

Image: fueleconomyhelp.com