# Simple Interest

$I = Prt$

**- Interest calculated as a percentage of the principal.**

I = Interest

P = Principal

r = rate (as a decimal)

t = time in years

# Compound Interest

**- The interest paid on the principal plus interest**

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

A = final value of the investment ... (principal + interest)
P = principal (invest/borrow)
r = annual interest rate (as a decimal)
n = number of compounding periods in a year
t = term of the investment or loan in number of years

# Terminology Tango

| | # of compounds per year |
|---|---|
| annualy → | 1 |
| semi-annually → | 2 |
| quarterly → | 4 |
| monthly → | 12 |
| semi-monthly → | 24 |
| bi-weekly → | 26 |
| weekly → | 52 |
| daily → | 365 |

Allison wants to invest $2000.00. Her bank offers an investment option that earns compound interest at a rate of 1.75% per year compounded annually for 3 years.

P = 2000.00

r = 0.0175

t = 3

| Interest period | Investment value at beginning of period | Interest earned I = Prt | Investment value at end of period |
|---|---|---|---|
| 1 | $2000 | $2000x0.0175x1= $35 | $2035 |
| 2 | $2035 | $2035x0.0175x1= $35.61 | $2070.61 |
| 3 | $2070.61 | $2070.61x0.0175x1= $36.24 | $2106.85 |

Allison wants to invest $2000.00. Her bank offers an investment option that earns compound interest at a rate of 1.75% per year compounded annually for 10 years.

| Interest period | Investment value at beginning of period | Interest earned I = Prt | Investment value at end of period |
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| 1 | $2000 | $2000x0.0175x1= $35 | $2035 |
| 2 | $2035 | $2035x0.0175x1= $35.61 | $2070.61 |
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??

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

A = final value of the investment ...(principal + interest) A = ?
P = principal P = 2000
r = annual interest rate r = 0.0175
n = number of compounding periods in a year n = 1
t = term of the investment or loan in number of years t = 10

Allison wants to invest $2000.00. Her bank offers an investment option that earns compound interest at a rate of 1.75% per year compounded annually for 10 years.

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

$$A = 2000\left(1 + \frac{0.0175}{1}\right)^{(1)(10)}$$

$$A = 2000(1 + 0.0175)^{10}$$

$$A = 2000(1.0175)^{10}$$

$$A = 2000(1.18944)$$

$$A = \$2378.89$$

Exponent Button:

$y^x$ or $x^y$ or $\wedge$

Calculate the final value of an initial investment of $6000.00. Interest is paid at 4% per annum, compounded semi-annually, for three years.

$A = ?$

$P = 6000.00$

$r = 4\%$

$r = 0.04$

$n = 2$

$t = 3$

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

$$A = 6000\left(1 + \frac{0.04}{2}\right)^{(2)(3)}$$

$$A = 6000\left(1 + 0.02\right)^{6}$$

$$A = 6000(1.02)^{6}$$

$$A = 6000(1.126162419)$$

$$A = \$6756.97$$

Calculate the final value of an initial investment of $8500.00. Interest is paid at 3.75% per annum, compounded semi-annually, for three years.

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

# Homework

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Questions 1-7

# the RULE of 72


Quick way to estimate how long it will take your money to double in value.

$$\frac{72}{\text{annual interest rate}}$$

How long will it take an investment to double with an interest rate of 3.00% per annum?

$$\frac{72}{3} = 24 \text{ years}$$