SIMPLE INTEREST
It Really Is Simple

CALCULATING SIMPLE INTEREST

Simple interest is calculated as a percentage of the principal on an investment or loan using the formula $I = Prt$ where:

- I = Interest amount (accumulated over time)
- P = Principal (the original amount)
- r = interest rate (expressed as a decimal)
- t = length of time (expressed in terms of years)

Simple interest is added to the principal at the end of the period using the formula $A = P + I$, where

- A = Total amount (principal + interest)

Interest Rate (r)

Show the following interest rates as they would appear in the simple interest formula as r.
*(Hint: Divide by 100, **or** move decimal 2 spaces to the **left**)*

a) 13% $= 13 \div 100$ $= 0.13$

b) 2.5% $= 2.5 \div 100$ $= 0.025$

c) 0.5% $= 0.5 \div 100$ $= 0.005$

Time (t)

Express the following lengths of time in terms of years (t in the simple interest formula)

a) 24 months $\frac{24}{12} = 2$ years

b) 8 months $\frac{8}{12} = 0.67$ years

c) 14 weeks $\frac{14}{52} = 0.27$ years

d) 82 days $\frac{82}{365} = 0.22$ years.

In the simple interest formula, time **MUST** be expressed in terms of years.
So… if ***time*** is given in:

- Months → ÷ by 12
- Weeks → ÷ by 52
- Days → ÷ by 365

EXAMPLE 1

a) Calculate how much interest is earned if $2 000 is invested at 4.5% simple interest for 26 weeks.

$I = ?$
$P = \$2000$
$r = 4.5\% = 0.045$
$t = \frac{26 \text{ weeks}}{52} = 0.5$

$I = P \cdot r \cdot t$
$= 2000 \cdot 0.045 \cdot 0.5$
$= 45$

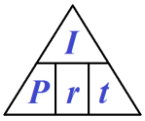
∴ The amount of interest earned is $45 in 26 weeks.

b) How much is the investment worth?

$A = P + I$
$= 2000 + 45$
$= \$2045$

The Simple Interest Triangle → Finding *P*, *r*, and *t*

Rearrange the simple interest formula to find the principal, interest rate, and time.

$I = Prt$ 

$P = \frac{I}{rt}$ $r = \frac{I}{Pt}$ $t = \frac{I}{Pr}$

EXAMPLE 2

How much principal is needed to earn $500 in interest in 2 years invested at 2.5% simple interest?

$I = \$500$
$P = ?$
$r = 2.5\% = 0.025$
$t = 2 \text{ years}$

$P = \frac{I}{rt}$
$= \frac{500}{0.025(2)}$
$= 10000$

∴ You need to invest $10,000

$P \xrightarrow{+ I =} A$

EXAMPLE 3

What rate of simple interest is needed to get $7 000 to grow to $10 000 in 5 years?

$I = 10000 - 7000 = 3000$
$P = 7000$
$r = ?$
$t = 5 \text{ years}$

$r = \frac{I}{Pt} = \frac{3000}{7000 \cdot 5} = 0.086$ → multiply it by 100 → 8.6%

∴ The interest rate needs to be 8.6%

$P \xrightarrow{+ I =} A$

EXAMPLE 4

How long would it take $1 500 to grow to $2 000 at a simple interest rate of 3%?

$I = 2000 - 1500 = 500$
$P = 1500$
$r = 3\% = 0.03$
$t = ?$

$t = \frac{I}{Pr} = \frac{500}{1500(0.03)} = 11.11$

∴ It would take approximately 11.11 years.