Equations – Literal

Interest - Simple

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Google: Mark Twain
He said, when loaning his money to someone, he was *most* concerned about the return **of** his money (Principle). However, we also expect a return **on** our money (Interest). For **simple interest**, the formula is

$$I = PRT$$

where

I = Interest earned

P = Principle, the original investment

R = Rate of return on our Principle. This is usually quoted in percent (%) **BUT** it must be converted to a decimal in *all* of the formulas ($\% = \frac{1}{100}$) which means the decimal *must* be moved two (2) places to the *left*. For example,

$$6\% = 6.\% = 6. * \frac{1}{100} = 0.06$$

Also, the rate is with respect to time, say

6% = 6% per year = 6%/year

T = Time invested (years, months, days, …) The units of the rate and time *must* match:

Let's say that the time is given in months, say 7, and the rate in years, say 6%/year. Then we *must* convert the rate to months:

We have 1 year = 12 months or 1 year / 12 months = 1 so that

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$$\frac{6\%}{year} = \frac{6 * \frac{1}{100}}{year} * \frac{1 year}{12 months} = 0.005 / month$$

Since RT is a number, all of the units *must* cancel:

$$RT = \frac{0.005}{month} * 7 months = 0.035$$

Example: If \$500 is loaned (P = \$500) for 7 months at 6% per year, then the interest (I) earned is given by

$$\begin{aligned} I &= PRT \\ &= (\$500)\left(\frac{6\%}{year}\right)(7 \text{ months}) \\ &= \$500 * 0.035 \\ &= \$17.50 \end{aligned}$$

Consider

$$I = PRT$$

This is 1 equation with 4 unknowns. In the prior example, note that we could find "I" when we knew the other 3. This is a literal (letter) equation with 4 unknowns. If any 3 are given, we can find the remaining unknown (missing one) by first solving $I = PRT$ for the missing one:

1. $I = PRT \Rightarrow T = \frac{I}{PR}$
2. $I = PRT \Rightarrow P = \frac{I}{RT}$
3. $I = PRT \Rightarrow R = \frac{I}{PT}$

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