

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Interest **Money Paid by** - the bank to you on money you invested  
 - you to whoever loaned you the money under the terms that you took out the loan

The amount of interest you pay is based on three elements:

1. The principle - the initial amount invested or borrowed
2. Time period - how long the money changed hands for
3. Rate - percentage calculated annually (once a year) unless otherwise stated

When it is time to pay back the money,

The full amount is paid back = Principle + Interest.

This is called simple interest and it is typically used for very short-term borrowing or investments. The formula is as follows:

$$I = Prt$$

interest accumulated  $\rightarrow$   $I$   $\leftarrow$  term / time period.  
 $\uparrow$   $\leftarrow$  rate invested / borrowed at principle amount

**Example** If you borrow \$1000 for five years at 10% simple interest, the interest is

$$P = 1000 \quad t = 5 \quad r = \frac{10}{100}$$

$$I = Prt$$

$$= (1000)(5)\left(\frac{10}{100}\right)$$

$$= \$500$$

The total amount due at the end of five years:

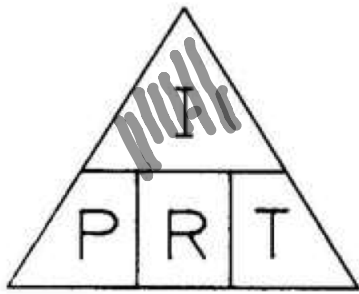
$$A = P + I$$

$$= 1000 + 500$$

$$= \$1500$$

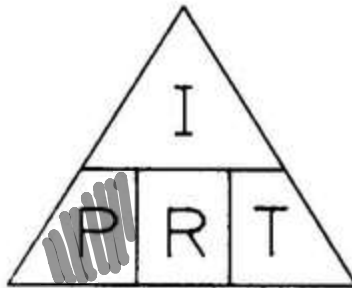
full or total amount  $\rightarrow$   $A$

When you borrow money, you owe the interest but when you invest money, you are owed interest. An investment is really a case where you lend your money to someone else and they pay you interest such as a bank does. The same equations apply when calculating simple interest that is earned except now principle is the amount invested and simple interest is the amount earned.

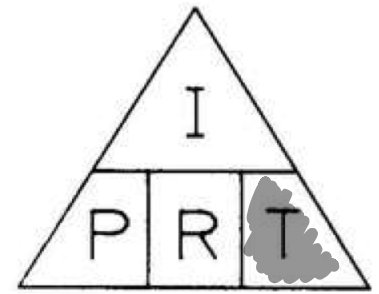


$$\frac{I}{r} = \frac{Prt}{r}$$

$$\frac{1}{t} \cdot \frac{I}{r} = \frac{Pt}{t}$$



$$P = \frac{I}{rt}$$



$$t = \frac{I}{Pr}$$

**Example** How much simple interest does a \$10 000 investment earn at 5.6% over 18 years? 18 months?

$P$

$$r = \frac{5.6}{100} = 0.056$$

$t$

$$t = \frac{18}{12} = 1.5$$

a.  $I = Prt$   
 $= (10000)(0.056)(18)$   
 $= \$10080$

b.  $I = Prt$   
 $= (10000)(0.056)(1.5)$   
 $= \$84$

**Example** Susan borrows  $\$8650$  to buy a used car and is charged  $4.5\%$  simple interest. If the term of her borrowing is  $5$  years, how much interest does she pay in total?

$$\hookrightarrow r = \frac{4.5}{100} = 0.045$$

$$I = Prt$$

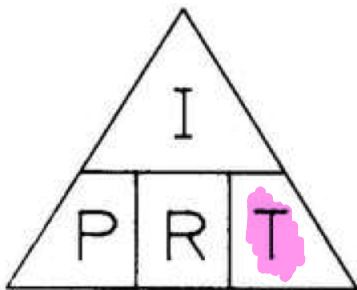
$$= (8650)(0.045)(5)$$

$$= \$1946.25$$

**Example** Henry invests  $\$5000$  in a mutual fund with an annual simple interest of  $7.5\%$ . How long will it take him to double his money?

$$r = \frac{7.5}{100} = 0.075$$

money doubles  $\Rightarrow$  the full amount will be  $\$10000$



$$A = P + I$$

$$10000 = 5000 + I$$

$$-5000 \quad -5000$$

$$5000 = I$$

$$t = \frac{I}{Pr}$$

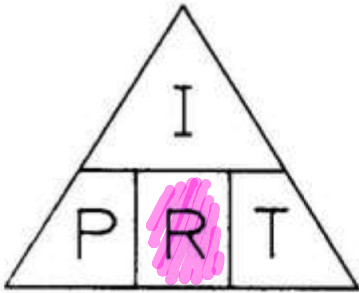
$$= \frac{5000}{(5000)(0.075)}$$

$$= 13.\bar{3} \text{ years}$$

It will take 13 years and 4 months for the investment to double in value.

Assignment

1. If Sheila paid \$797.50 in <sup>I</sup> **simple interest** on a <sup>t</sup> 5 year loan of <sup>P</sup> \$5 800. What was the simple interest rate?



$$r = \frac{I}{Pt}$$

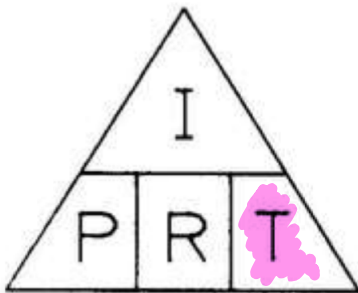
$$= \frac{797.50}{(5800)(5)}$$

$$= 0.0275$$

$$= 2.75\%$$

← remember this is a decimal - change it to a percent!

2. Dorothy loaned John <sup>P</sup> \$5000 at a **simple interest** rate of 6%. He repaid her \$5750 to cover the principal and interest. How long did he borrow the money?



$$A = P + I$$

$$5750 = 5000 + I$$

$$\begin{matrix} -5000 & -5000 \\ 750 = I \end{matrix}$$

$$r = \frac{6}{100}$$

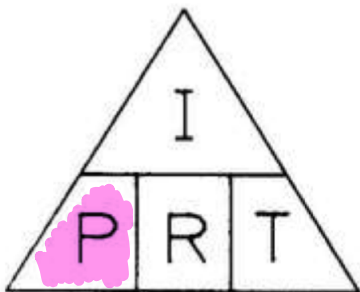
$$t = \frac{I}{Pr}$$

$$= \frac{750}{(5750)(0.06)}$$

$$= 2.14 \text{ years}$$

$$\xrightarrow{\text{approximately}} \approx 2 \text{ years and 2 months}$$

3. How much money was invested at 6% annual simple interest for 3 years to earn \$3870?



$$r = \frac{6}{100}$$

$$P = \frac{I}{rt}$$

$$= \frac{3870}{(0.06)(3)}$$

$$= \$21\,500$$