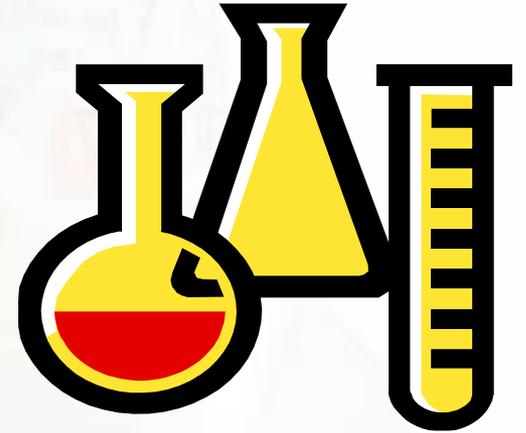




# Chapter 10

## Simple Interest

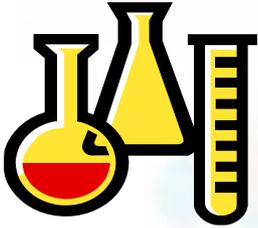
# Maturity Value



**Maturity Value (MV) = Principal (P) + Interest (I)**

**The amount of the loan  
(Face value)**

**Cost of  
borrowing  
money**



# Simple Interest Formula

**Simple Interest (I) = Principal (P) x Rate (R) x Time (T)**

**Stated as a Percent**

**Stated in  
years**

**Ryan borrowed \$30,000. The loan was for **2 years** at a rate of 8%. What is interest and maturity value?**

$$\text{SI} = \$30,000 \times 0.08 \times 2 = \$4,800$$

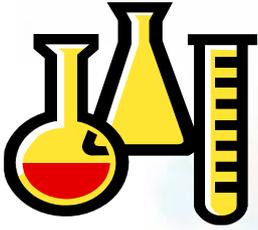
$$\text{MV} = \$30,000 + \$4,800 = \$34,800$$

What if you borrow for less than a full year?

How do you calculate the interest charge then?

See next slide.





# Simple Interest Formula

Simple Interest (I) = Principal (P) x Rate (R) x Time (T)

Stated as a Percent

Stated in  
years

Ryan borrowed \$30,000. The loan was for **6 months** at a rate of 8%. What is interest and maturity value?

$$SI = \$30,000 \times .08 \times \frac{6}{12} = \$1,200$$

$$MV = \$30,000 + \$1,200 = \$31,200$$

***Do all of the multiplication before doing the division for partial years.***

## Two Methods of Calculating Simple Interest and Maturity Value



**Exact Interest (365 Days)**

$$\text{Time} = \frac{\text{Exact number of days}}{365}$$



**Ordinary Interest (360 Days)  
Bankers Rule**

$$\text{Time} = \frac{\text{Exact number of days}}{360}$$

# Two Methods of Calculating Simple Interest and Maturity Value

On March 4, Ray borrowed \$40,000 at 8%. Interest and principal are due on July 6.

## Exact Interest (365 Days)

$$I = P \times R \times T$$

$$\$40,000 \times .08 \times \frac{124}{365}$$

$$\$1,087.12$$

$$MV = P + I$$

$$\$40,000 + \$1,087.12$$

$$\$41,087.12$$

## Ordinary Interest (360 Days)

$$I = P \times R \times T$$

$$\$40,000 \times .08 \times \frac{124}{360}$$

$$\$1,102.22$$

$$MV = P + I$$

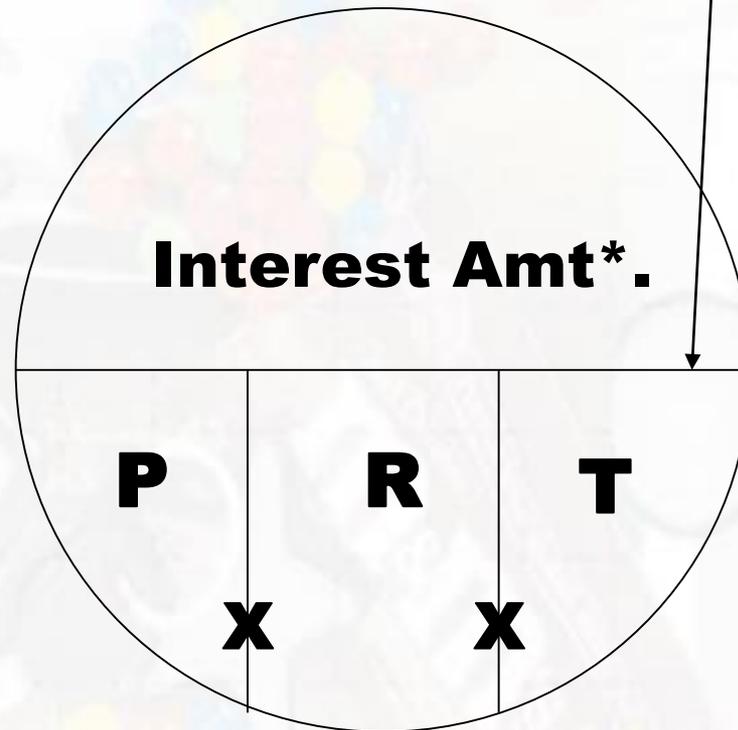
$$\$40,000 + \$1,102.22$$

$$\$41,102.22$$

# Using the Diagram

**This line stands  
for division.**

To solve for any single value in the bottom half of the chart, multiply the two values you know and then divide them into the interest amount in the top half of the diagram.



$$* \text{Interest Amount} = P * R * T$$

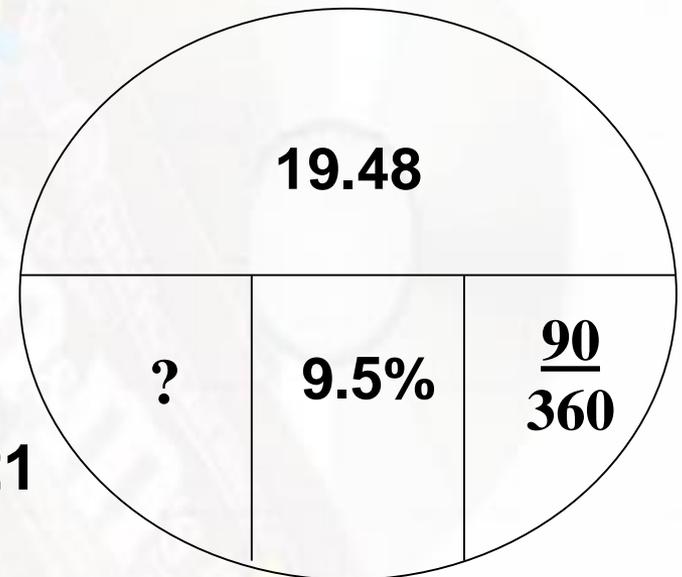
# Finding Unknown in Simple Interest Formula - Principal

$$\text{Interest (I)} = \text{Principal (P)} \times \text{Rate (R)} \times \text{Time (T)}$$

Christina Jones paid the bank \$19.48 interest at 9.5% for 90 days. How much did she borrow?

$$\text{Principal} = \frac{\text{Interest Amt.}}{\text{Rate} \times \text{Time}}$$

$$P = \frac{\$19.48}{.095 \times (90/360)} = \$820.21$$



.095 times 90 divided by 360. *Do not round answer*

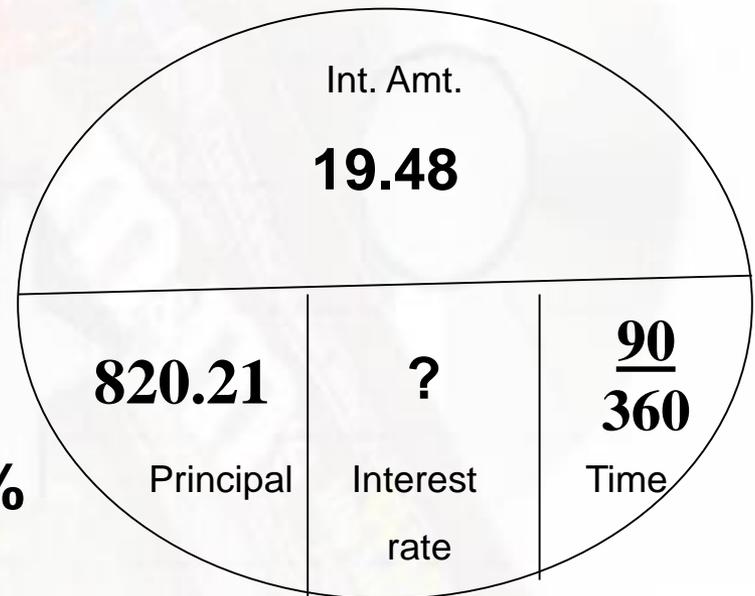
# Finding Unknown in Simple Interest Formula - Rate

$$\text{Interest (I)} = \text{Principal (P)} \times \text{Rate (R)} \times \text{Time (T)}$$

Christina Jones borrowed \$820.21 from the bank. Her interest (amt.) is \$19.48 for 90 days. What rate of interest did Christina pay?

$$\text{Rate} = \frac{\text{Interest (amt.)}}{\text{Principal} \times \text{Time}}$$

$$R = \frac{\$19.48}{\$820.21 \times (90/360)} = 9.5\%$$



# Finding Unknown in Simple Interest Formula - Time

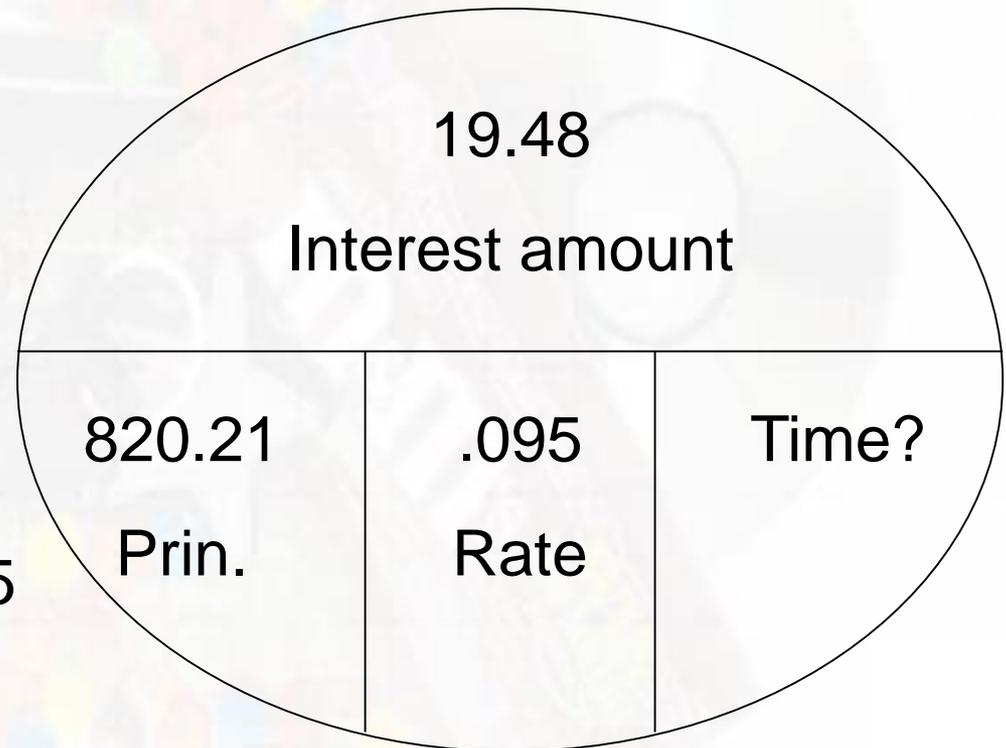
$$\text{Interest (I)} = \text{Principal (P)} \times \text{Rate (R)} \times \text{Time (T)}$$

Christina Jones borrowed \$820.21 from the bank. Her interest (amt.) is \$19.48 for 9.5%. How much time does Christina have to repay the loan?

$$\text{Time (yrs)} = \frac{\text{Interest (amt.)}}{\text{Principle} \times \text{Rate}}$$

*Convert years to days  
(assume 360 days)*

$$T = \frac{\$19.48}{\$820.21 \times .095} = .25$$
$$.25 \times 360 = 90 \text{ days}$$



## U.S. Rule - Making Partial Note Payments before Due Date

**Any partial loan payment *first covers any interest that has built up.* The remainder of the partial payment reduces the loan principal.**

*Allows the borrower to receive proper interest credits*

*Example on next page*

Darren owes \$3,000 on an 10%, 90 day note. On day 40, Darren pays \$1,200 on the note. Assume a 360- day year. What is Darren's Adjusted balance after day 40? What is the ending balance due?

Step 1. Calculate interest on principal from date of loan to date of first early payment. [calculating 40 days worth of interest]

$$\$3,000 \times .10 \times \frac{40}{360} = \$33.33$$

Step 2. Apply partial payment to interest due. Subtract remainder of payment from principal

$$\begin{aligned} \$1,200 - 33.33 &= \$1,166.67 \\ \$3,000 - 1,166.67 &= \$1,833.33 \end{aligned}$$

↑  
Adjusted balance

Step 3. At maturity, calculate interest from last partial payment. Add this interest to adjusted balance.

$$\begin{aligned} \$1,833.33 \times .10 \times \frac{50}{360} &= \$25.46 \\ \$25.46 + \$1,833.33 &= \$1,858.79 \end{aligned}$$