Section 11.2 Personal Loans and Simple Interest

Principal of a loan Money the lender will give you.

Security or collateral What the bank can sell of yours to pay off the loan - car, bank accounts, home, stocks and bonds...

Cosigner Another person signs the loan with you with collateral if you default on the loan.

Interest The money you pay the bank for the borrowing money.

Simple Interest Formula

Interest = principal X rate X time

$i = prt$

time = days, months, or years

time will always be expressed in the same period as the rate

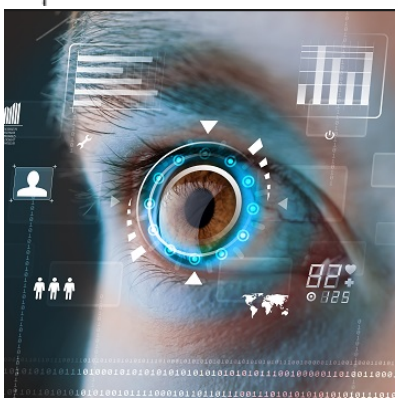
To compute interest, each month has 30 days and a year has 12 months or 360 days

EXAMPLE 1 *Eye Surgery Loan*

Chad Cohen needs to borrow $2200 to have corrective eye surgery. From his credit union, he obtains an 18-month loan with an annual simple interest rate of 7.5%.

a) Calculate the simple interest on the loan.

b) Determine the amount (principal + interest) Chad will pay the credit union at the end of the 18 months.



a) $I = 2200(.075)1.5$

$I = \$247.50$

b) $2200 + 247.50 = 2447.50$

EXAMPLE 2 *Determining the Annual Rate of Interest*

Philip Mahler agrees to lend $850 to his friend Joe Mahoney to help Joe travel to Cincinnati to attend a family wedding. Nine months later, Joe repaid the original $850 plus $51 interest. What annual rate of interest did Joe pay to Philip?

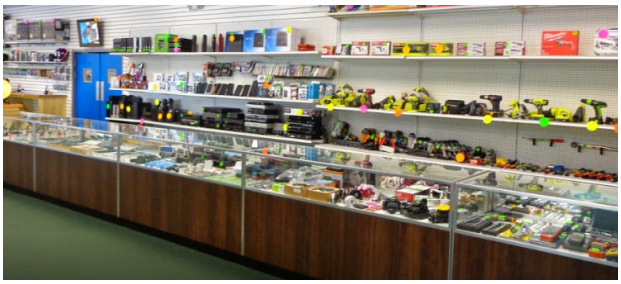
$I = prt$

$51 = 850r\left(\frac{9}{12}\right)$

$r = .08$ 8%

EXAMPLE 3 *A Pawn Loan*

To obtain money for new eyeglasses, Gilbert French decides to pawn his trumpet. Gilbert borrows $240 and after 30 days gets his trumpet back by paying the pawnbroker $288. What annual rate of interest did Gilbert pay?



$I = 288 - 240$

$I = prt$

$48 = 240r\left(\frac{30}{360}\right)$

$r = 2.4$ 240% .

Discount Note - The interest is paid at the time the borrower receives the loan. The interest is paid first. A Federal Reserve Treasury Bill is a discount note issued by the U.S. government.

EXAMPLE 4 *True Interest Rate of a Discount Note*

Siegrid Cook took out a $500 loan using a 10% discount note for a period of 3 months. Determine

a) the interest she must pay to the bank on the date she receives the loan.

b) the net amount of money she receives from the bank.

c) the actual rate of interest for the loan.

a) $I = 500(.10)\left(\frac{3}{12}\right) = 12.50$

b) $\text{Net} = 500 - 12.50 = 487.50$

c) $I = Prt$

$12.50 = 487.50\, r\left(\frac{3}{12}\right)$

$r = .1025 \quad 10.25\%$

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Julie Jansen borrowed $3650 from her bank for 8 months. The bank discounted the loan at 7.5%.
a) How much interest did Julie pay the bank for the use of the money? 182.5
b) How much did she receive from the bank? 3650 − 182.50 = 3467.5
c) What was the actual rate of interest she paid?

$182.50 = 3467.50\, r\left(\frac{2}{3}\right)$

$r = 7.89\%$ 07.89

$r = .0789$

EXAMPLE 5 *Partial Payments*

Ken Hurley wishes to purchase a new racing bicycle but does not have the $2000 purchase price. Luckily, the bike shop has two payment options. With option 1, Ken can pay $1000 as a down payment and then pay $1150 in 6 months. With option 2, Ken can pay $500 as a down payment and then pay $1700 in 6 months. Which payment option has a higher annual simple interest rate?

Opt 1 $P = 1000$ $t = \frac{6}{12}$ $I = 150$

$150 = 1000\, r(.5)$

$r = .3 = 30\%$

Opt 2 $P = 1500$ $t = 6/12$ $I = 200$

$200 = 1500\, r(.5)$

$r = .2666$ 26.66%