

## Amortized Loans

↳ loan paid off in a series of regular equal payments

Student Loans

Auto Loans

Home Loans

A simple interest amortized loan is really an annuity whose FV is the loan amount plus interest. Each payment has an interest portion figured with  $I = Prt$ .

$$P(1+i)^n = \text{pymt} \cdot \frac{(1+i)^n - 1}{i}$$

$P$  = present value (loan amount)

$i$  = periodic interest rate

$n$  = # of payments

pymt = amount of payment

ex: Purchase Price = \$187,600

20% down = 37,520

Borrows \$150,080 = P

$r = 6\frac{3}{8}\% = 6.375\%$

$t = 30$  yrs

$n = 30 \cdot 12 = 360$

$i = \frac{.06375}{12}$

What is her payment?

$$P(1+i)^n = \text{pymt} \cdot \frac{(1+i)^n - 1}{i}$$

$$150080 \left(1 + \frac{.06375}{12}\right)^{360} = \text{pymt} \cdot \frac{\left(1 + \frac{.06375}{12}\right)^{360} - 1}{\frac{.06375}{12}}$$

on calculator

$$150080 \left(1 + \frac{.06375}{12}\right)^{360} \text{ enter}$$

$$\left(\left(1 + \frac{.06375}{12}\right)^{360} - 1\right) / \left(\frac{.06375}{12}\right) \text{ enter}$$

$$1010910.135 = \text{pymt} \cdot 1079.681594$$

$$\text{pymt} = \$936.30$$

What is total interest Shirley pays?

$$936.30 \times 360 - 150080$$

$$= \$186,988$$

Amortization Schedule - how much of each payment goes to principal and how much to interest?

Payment #	Payment	Int Portion	Principal Portion	Balance
0	—	—	—	150,080
1	936.30	① 797.30	② 139.00	③ \$149,941.00
2	936.30	④ 796.56	139.74	\$149,801.26

$$\textcircled{1} I = Prt = 150080 \times .06375 \times \frac{1}{12} = 797.30$$

$$\textcircled{2} \quad \text{Payment} - \text{Int Portion} = 936.30 - 797.30 = 139$$

$$\textcircled{3} \quad \text{Balance} - \text{Princ. Portion} = 150080 - 139 = 149,941$$

$$\textcircled{4} \quad 149941 \times .06375 \times \frac{1}{12} = 796.56$$