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FRM

ARM

Math 1030 #10a

Loans, Credit Cards and Mortgages

Loans

Installment Loan

Payday Loan

Loans, credit cards and mortgages are ways you borrow money. When you borrow money, the bank is basically making a lump sum investment and getting a periodic return.

Principal is the amount of money owed at any particular time.

Interest is charged on the principal.

To pay off a loan, you should pay the interest and also some part of the principal.

An installment loan (amortized loan) is a loan payed off with equal regular payments.

Loan Payment Formula (Installment loans)

$$PMT = \frac{P \cdot \left(\frac{APR}{n} \right)}{\left[1 - \left(1 + \frac{APR}{n} \right)^{(-nY)} \right]}$$

PMT = regular payment amount
P = starting principal
APR = annual percentage rate
n = number of payments per year
Y = the term of the loan (years)

EX 1: You have a student loan of $40,000 with an APR of 6%. Compare monthly payment amounts and total amount paid for these options.

$$PMT = \frac{P \cdot \left(\frac{APR}{n}\right)}{\left[1 - \left(1 + \frac{APR}{n}\right)^{(-nY)}\right]}$$

15 years   25 years

EX 2: For the loan in example 1, make a table showing the amounts of each monthly payment that goes to the principal and to the interest for the first three months. ($40,000 at 6% for 15 yrs)

	Loan balance	interest	payment	principal paid
1				
2				
3				

EX 3: You borrow $4000 to buy a used car. You can afford monthly
payments of $150. Which of these meets your needs?

2 years at 8% APR

$$PMT = \frac{P \cdot \left(\frac{APR}{n}\right)}{\left[1 - \left(1 + \frac{APR}{n}\right)^{(-nY)}\right]}$$

3 years at 9% APR

4 years at 10% APR

EX 4: A payday loan company charges $150 to borrow $1000

for 2 weeks. What is the APR?