Math 1030 #10a

Loans, Credit Cards and Mortgages

Loans
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)**

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

- **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.

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

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)

<table>
<thead>
<tr>
<th>Loan balance</th>
<th>interest</th>
<th>payment</th>
<th>principal paid</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3</td>
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</tr>
</tbody>
</table>
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

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?