MA111: Contemporary mathematics

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SCHEDULE:

- Exam 2 is Monday, Oct 3rd, during class.

Today we will look at some of the details for actual credit cards.

Credit cards

- U.S. Credit cards have APRs from 7% to 36% with 20%-30% being quite common

- Each credit card is different; this is only a rough guide to "typical"

- Rewards programs pay you to borrow money

- Paying off the whole balance each month results in no fees

- Paying off at least the minimum balance results in interest fees

- Missing the minimum payment once results in late fees

  That you agreed to in the contract.

- Missing the minimum payment twice in a row results in unlimited fees and interest rates applied to entire balance

Example 1

- APR 18%, compounded monthly, typical credit card

- You charge $742.36 on September 2, 2011
  and $451.24 on September 10, 2011

- Typical bill summary:

Previous Balance	0.00
Plus Purchases	742.36
Plus Fees/Charges	0.00
Less Payments	0.00
Interest Rate	1.5%
Total Amount Due	742.36
Minimum Amount Due	20.00
Statement Date	September 6, 2011
Payment Due Date	September 26, 2011

Bills are slightly tricky

- You spent $742.36 + $451.24 = 1193.60
  but only $742.36 is billed

- The $451.24 is after the statement date
  Will be on next month's bill

- Interest rate is already divided by 12 (monthly, not APR)

- No interest has been charged; you borrow for free for now!

Pay it off every month

- If you pay $742.36 on time, then your next bill looks like:

Previous Balance	742.36
Plus Purchases	451.24
Plus Fees/Charges	0.00
Less Payments	742.36
Interest Rate	1.5%
Total Amount Due	451.24
Minimum Amount Due	20.00
Statement Date	October 6, 2011
Payment Due Date	October 26, 2011

- No interest still! The $451.24 appears though.

Pay it off again!

- If you pay $451.24 on time, then the next bill looks like:

Previous Balance	451.24
Plus Purchases	0.00
Plus Fees/Charges	0.00
Less Payments	451.24
Interest Rate	1.5%
Total Amount Due	0.00
Minimum Amount Due	0.00
Statement Date	November 6, 2011
Payment Due Date	November 26, 2011

- No interest again! No balance due.
  The card is now idle and mostly safe.

False economy: why not make the minimum payment

- What if you only make the minimum payment for September?

Previous Balance	742.36
Plus Purchases	451.24
Plus Fees/Charges	17.60
Less Payments	20.00
Interest Rate	1.5%
Total Amount Due	1191.20
Minimum Amount Due	20.00
Statement Date	October 6, 2011
Payment Due Date	October 26, 2011

- The $20 you paid on the September bill is reflected in the *less payments* line.

- But there is a $17.60 Fee!

Details of the total amount due

$$\begin{aligned}
\text{Total} &= \text{Prev Bal} + \text{New Purch} + \text{Fees} - \text{Payment} \\
&= 742.36 + 451.24 + 17.60 - 20.00 \\
&= 1191.20
\end{aligned}$$

- The \$17.60 is 1.5% interest on the

$$\begin{aligned}
\text{BSFC} &= \text{Prev Bal} + \text{New Purch} - \text{Payment} \\
&= 742.36 + 451.24 - 20.00 \\
&= 1173.60
\end{aligned}$$

$$(\$1173.60)(0.015) = \$17.60$$

- Note that you paid interest on the remaining Sep 2 purchase, and **all** of the Sep 10 purchase

- At this point we have an installment loan like on the exam

- No new purchases, \$20 payment per month $=$ 12 years of payments

A real-life scenario

- You are in love

- The object of your affection abhors debt and so has no credit card

- They love Outback Steakhouse, and so you usually pay with your credit card

- $40 per time, about 5 times per month, $200 per month

- Credit card has 24% APR, minimum payment of $40

- A year later you break up; what's your damage?