Worksheet 23 (Finance 3): Credit Cards and Mortgages

Group names: _

Instructions: You must use spreadsheets for the problems on the first page. You are encouraged to use spreadsheets for the back page, but you can also use a calculator if you choose.

1. An Alaska Airlines Bank of America Credit Card charges an APR of 16.99% on purchases. The minimum monthly payment is \$25 or 1% of the balance on the account, whichever is larger¹.

Suppose you have \$1500 in purchases on the credit card and you put no more purchases on the card.

- (a) What is the minimum monthly payment for this balance?
- (b) How much interest is charged in the first month?
- (c) If you pay the minimum monthly payment in month 1, how much is your balance in month 2? _____
- (d) Suppose you pay \$100/month to your credit card bill. Use a spreadsheet to determine how long it will take you to pay off the balance.
 - i. How many months did it take to pay off your balance? ______ How many years? _____
 - ii. How much money did you pay in total? _____
 - iii. How much of your payment was interest? _____
- (e) Suppose you only paid \$25/month to the bill.
 - i. How many months did it take to pay off your balance? ______ How many years? _____
 - ii. How much money did you pay in total? _____
 - iii. How much of your payment was interest? _____

¹The balance is usually compounded daily, even though the payments are monthly. We are pretending that the balance is compounded monthly for this problem.

- 2. The Chase Freedom Unlimited credit card has a variable APR of 18.99% to 28.49%, based on your creditworthiness and other factors.²
 - (a) If you had a balance of \$1500, you were charged an APR of 28.49%, and you made monthly payments of \$25, how much would you owe at the end of the first month?
 - (b) How much would you owe at the end of the first year?
 - (c) What does that say about how long it would take to pay off your balance, if you only paid \$25/month?

3. The formulas for computing information about a loan are as follows:

P = principal / starting amount	r = annual interest rate (APR)
I = interest	n = number of compounding periods per year
A = final amount	t = length of the loan, in years
	d = regular loan payment

Loan amount given payment	payment given loan amount
$P = \frac{d\left(1 - \left(1 + \frac{r}{n}\right)^{(-nt)}\right)}{\left(\frac{r}{n}\right)}$	$d = \frac{P\left(\frac{r}{n}\right)}{\left(1 - \left(1 + \frac{r}{n}\right)^{(-nt)}\right)}$

Suppose you want to pay off the \$1500 Alaska Airlines credit card charge (APR of 16.99%) in a certain amount of time, given monthly payments and compounding (n = 12). You can think of the \$1500 as a loan. What does your monthly payment need to be (find d) to pay off your credit card in:

(a) 3 years? _____

Check your answer by doing the previous fill-down computation. You should get that you owe 0 after ______months.

(b) 1 year? _____

Check your answer by doing the previous fill-down computation. You should get that you owe 0 after ______months.

(c) 6 months? _____

Check your answer by doing the previous fill-down computation.

²Apparently, for the Chase Freedom Unlimited credit card, the minimum payment is the greater of \$40 or 1%..

- 4. Suppose you want to buy a house that costs \$200,000 (after your downpayment). Suppose you can get a 30-year fixed rate mortgage at a 6.940% APR (this is a current rate).
 - (a) What will your monthly payment be? (You know P, you want d; assume n = 12.)

(b) How would your previous answer change if mortgage rates went down to 4% APR?

(c) With that same 30-year fixed rate mortgage at a 6.940% APR, if you can afford a monthly mortgage payment of \$800, how much money can you afford to spend on a house? (You know d, you want P.) _____

(d) How much of a mortgage can you take out if you can afford a monthly payment of \$1000? _____

(e) If you had a mortgage on a \$200,000 house with a monthly payment of \$1323, and instead you paid \$1500 every month, how quickly would you be able to repay the mortgage?