Finance Worksheet

FYS 129 – Mathematics and Finances

(Values from Fall 2010)

1. SHORT TERM SAVING. Smartypig (`http://www.smartypig.com/`) has short term savings accounts with 1.75% APY.

   (a) If you can save $50 a month, how long will it take to buy a $750 LCD TV (like this one).

   (b) If you can save $100 a month, how much will you have when you finish college?

   (c) If you want to have $5,000 for a trip to Europe when you finish college, how much will you need to save?

   (d) Make up your own examples!

2. CAR LOANS. You want to buy a car. You can find some loan rates at `http://www.bankrate.com/`. You can find car prices from `http://www.edmunds.com/`.

   (a) If you plan to buy a $8,000 used car in 36 months, the lowest rate (APR) from the web site above is 3.65%, highest is 6.50% and the average is 5.576%. Check what your payments would be in those cases. Also, see how different down payments would affect your monthly payments.

   (b) If you want to buy a new Honda Civic LX (automatic), the average price for Knoxville is $16,775 plus 9.75% of sales taxes. The 60 month loan rates for cars have minimum 3.15%, average 4.56%, and maximum 6.24%. How much would your payments be? How about if you buy a Hyundai Accent (automatic with typical "Premium Equipment Package"), which costs $14,639 (plus taxes). Check different down payments.

   (c) Check the payments above with "promotional" rates such as 0.9% for 36-months and 1.9% for 60 months. Check different down payments.

   (d) Suppose that for you to have a promotional 1.9% on the Honda Civic, you need a down payment of $3,000. (I'm making up this number.) If you can save $150 (change this number if you want) a month and use Smartypig, how long until you can buy the car, and how much will the payments be?

   (e) How about if you want to buy the car within a year in the previous example? How much will you have to save every month in Smartypig?

   (f) (Harder!) Suppose that you can only afford $250 a month, but you want to buy the Honda. So you start saving that with Smartypig until you have the necessary down payment to make your monthly payments equal to $250. How much is the down payment and how long will it take for you to save it.

3. MORTGAGES. I've found some houses at `http://www.homesforsaleknoxville.com/` and rates at `http://www.bankrate.com/`. The (fixed) rates for 30 year mortgages vary from 4.3% to 4.8%.

Here are some houses:

- 2 Bedroom Condo in South Knoxville: Type: Condominium Style: Traditional Bedrooms: 2 Bathrooms: 2 Basement: Yes, Slab Size: 1,032 sq. ft. Lot Size: 43.69ft x 90.51ft Year Built: 2003 Taxes: $639.00 (2009) Condo Fees: $65.00. **Price:** $105,000.

- 3 bedroom in Fountain City: Type: Residential Style: Ranch with bonus Bedrooms: 3 Bathrooms: 3 Garage: Double, Attached Basement: No Size: 2,034 sq. ft. Lot Type: Rectangular Lot Size: 0.37acres 59ft x 224ft Year Built: 2006 Taxes: $1,300.62 (2008). **Price:** $209,900.

- 4 Bedroom House in Faragut: Style: Traditional Bedrooms: 4 Bathrooms: 2 Garage: Double, Attached Basement: Yes, Full "Finished" Size: 3,546 sq. ft. Lot Type: Irregular Lot Size: 1.1acres 137ft x 332.92ft Year Built: 1979 Taxes: $2,037.86 (2010). **Price:** $389,900.

(a) Check your monthly payments for those homes with different down payments. Remember to take into consideration the condo fees (if any) and annual taxes.

(b) Also, if you can afford $1,000 a month, with a down payment of $20,000 and an APR of 4.65%, what is the most expensive home you can buy?

(c) (Harder!) If your $1,000 a month must also be used to pay the annual taxes, say 0.5% of the value of the house, then what is the price of the house you can afford?

(d) Try with different numbers too!

4. RETIREMENT.

(a) If you can save $600 a month and plan to retire in 40 years, how much will you have at that point? Assume that the APY for the next 3 years will be 1.5%, for the next 5 years 2.5%, 3.5% for the following 10 years, and 4% after that.

(b) You want to retire right now. You've saved $700,000 in a savings account that now has 3% APR and you need $2,500 a month for your expenses. How many years can you live out of your savings until you run out of money?

(c) Now suppose you have $700,000 in a savings account that now has 3% APR, but you project that you will leave for at most another 30 years. How much can you withdraw a month?

(d) (Harder!) You want to plan your retirement. You project that you will live to be 100 years old, you can save $600 a month, and you need $2,500 a month for expenses. How long will it take for you to retire. (So, you will save until you have enough in order to be able to withdraw $2,500 a month for the rest of your 100 years.) You can assume a fixed APR, like 3.5% or you can use the variation of APY in the first item.

(e) (Even harder!) Repeat the above taking inflation into account. Say, that we have inflation of 1% a year. (This is like an APY, not APR, and it is compound continuously!)