

Project: The American Dream!

The goal of Math 52 and 95 is to make mathematics real for you, the student. You will be graded on correctness, quality of work, and effort. You should put in the effort on this because nothing you will do in this class will be more relevant to the real world. Everything should be typed and look professional (grammar/spelling errors will be non-existent). Color pictures, color printing, and nice binders are optional, but everything you turn in should look good (it will probably be worth it to spring for a fifty cent binder or folder). For each part, be sure to answer all the questions in sentence form. Put in the effort and **you'll be rewarded** as this project is worth the same as one exam. The more realistic you make this project, the more applicable it will be to your life. If you have any questions about any part of this project, please discuss it with me after class, during office hours, or email me directly. I will respond to your questions as quickly as I can; typically you will have a response in less than a day.

Project due: – **You'll get it back this term.**

PART 1 – FINDING A JOB, CAR AND HOME

1. **Find your job.** You are in college for a reason...to get a job or to get a different job than you already have. Describe the job you would like to have when you graduate. Tell me how much your job pays in the area you want to live, how you determined this (call a professional in the field, use classifieds, web site like Salary.com, etc.), and why you want to do this for a living. You can take this as far as you want, but please, for your sake, be realistic. You will probably not make over \$100,000 your first year out of college, and for some careers it might be more like \$40,000. If you plan on being married or living with someone to share expenses, you should include a separate paragraph stating what your partner does and how much he or she will make (hypothetically or realistically). In conclusion, determine what your monthly salary would be, or the salary of you and your partner combined. If you don't want to live in Oceanside, you should tell me this and adjust your salary and all other monetary figures accordingly to the place you want to live. [EX: \$60,000 per year or \$5,000 per month.]
2. **Find your car (1.4).** Now that you have this job, you must determine what type of vehicle you will drive. If you have been using the 1974 Pinto station wagon, you may decide on a new vehicle. Describe what vehicle you would WANT to drive, insert a picture, and include a description of the car. I want you to look for new cars (or newer used cars) from dealers in the vicinity. Each of you will have to come up with a value for the car whether you decide to purchase it or not. For this car, you will have to calculate the monthly payment yourself – don't trust the website. Everyone must show the formulas for calculating the monthly payment. You may have to call a bank or car dealer, or find the rate online, to determine the type of interest and the rate on a new or used car loan – please include where you found the rate. Your equations should look professional like this (of course you will use your information)... a \$10,000 car at 8.25% annual interest for 5 years.

$$10,000 \left(1 + \frac{0.0825}{12} \right)^{60} = pymt \frac{\left(1 + \frac{0.0825}{12} \right)^{60} - 1}{\left(\frac{0.0825}{12} \right)} \Rightarrow pymt = \$203.96$$

When done, tell me if you would actually purchase this car. If not, tell me what you plan on driving around town (include your rate and your payment amount). If you have your car paid off now, and this is the vehicle you want to keep driving, tell me this, and include a sentence stating that your monthly payment will be \$0. Remember, be realistic and try not to buy the extreme luxury or sports car as a first new car: a nice sedan or coupe would probably do just fine. ☺

3. **Home Affordability (1.4).** Next, you'll need to determine how much you could afford as a monthly payment for a house. This monthly amount is based on your monthly salary from #1. FHA loans have a maximum of 43% of your gross monthly income can go to any loan obligation. This does not count utilities, cable, phone, TV, etc. Further, the ratio of house payment to gross monthly income can't exceed 31%. Let's find how much you could afford per month. For things like credit cards, student loans, and other loan/lien information, please make a reasonable estimate of your debt or include actual monthly payments. Student loans may be approximated at 6% interest with a repayment term of 10 years – most require a monthly payment.

Example:

| Type | Total Owed | Monthly Payment |
|----------------------|------------|-----------------|
| Student Loan | \$18,000 | \$200.00 |
| Credit Card | \$2,250 | \$90.00 |
| Car Payment from (2) | \$10,000 | \$203.96 |
| Totals | | \$493.96 |

For the example, the monthly salary is \$5,000 before taxes. So we need to check both ratios.

- (A) Multiply the gross monthly salary by 43% to get $\$5,000 \times 0.43 = \$2,150$. Subtract all loans and monthly obligations: $\$2,150 - \$493.96 = \$1,656.04$.
- (B) Multiply 31% by the gross monthly salary to get $\$5,000 \times 0.31 = \$1,550$.
- Between \$1,656.04 and \$1,550, we need to choose the smaller one of \$1,550. The home that you can shop for will be a multiple of this – most likely between 130 and 170 times.
- Example: Use the midpoint for a gauge $\$1,550 \times 150 = \$232,500$.
- Assume 10% down payment, so $232,500 \div 0.90 = \$258,333.33$.
- This is the range of home price that you can afford... time to find a home!

4. **Find your home and home price.** Using the amount you found in #3, search the classified ads for the home of your dreams (in your price range). Include a picture and description; Zillow.com is a pretty good place to start. The picture could come from the paper, ads, or a real estate agent. Include at least a paragraph about why you like it, what features you enjoy, and how well it fits your budget. Also include the bid (total sale price) you would tell the seller you would pay for this home. This is the real world, so let's assume you can bid less than the quoted price; however, go too low and lose the home. If the home is a good deal, you may not want to lower the price. Your bid price should be within 2% of the asking price, unless the ad for the home says the price is **firm**.

- For the example, we'll choose a \$259,000 home and offer \$255,000. They accept!

3502 Boussock Ln,
Oceanside, CA 92057
2 beds · 2 baths · 1,046 sqft

Prime location! Newly remodeled condo has an open floor plan and features: new dual pane windows & doors, new ceiling fans and light fixtures, engineered wood flooring, fresh paint and new baseboards throughout. Chef's kitchen features new cabinets, new appliances, new sink hardware, new granite counter tops and ample cabinet space. Bathrooms have new tile floors hardware and counters.

• FOR SALE
\$259,000
Zestimate®: \$202,688
EST. MORTGAGE
\$932/mo
Get pre-approved



PART 2 – PURCHASING THE HOME

5. **Down Payment.** Call a bank of your choice (or use a current website) and determine what the 15-year fixed and 30-year fixed mortgage rates are. Some banks call these conventional loans since the rates are fixed and the payment doesn't change for the length of the loan. Include why you chose this bank, what bank it is, and any information you have about their history in the home loan department (talk to friends, clients, etc.). For this project, you will have to choose from the following options for a down payment: 5%, 10%, or 15%. Pick one and find the down payment amount. Subtract this amount from the total bid price to get the loan amount. NOTE: If you choose to take a “no down payment” loan and you qualify for this loan, you will need to scale all calculations with the help of a mortgage specialist or myself (quite time consuming). For this project, you are **not allowed** to choose an adjustable rate mortgage or ARM.
- For the example, we'll pick a 15 year fixed rate of 2.95% and a 30 year fixed rate of 3.95%.
 - We will put down 10%, which is $\$255,000 \times 10\% = \$25,500$.
 - Our loan amount will be $\$255,000 - \$25,500 = \$229,500$.
6. **P & I Payment (1.4).** You will need to determine the P & I payment on each of the loan types, 15-year and 30-year. Make sure you include the formulas and calculations (typed). How much total interest you would pay on each loan? How much more is the monthly payment on the 15-year loan? Analyze both options. Remember to round up to the nearest penny – always round up!
- For the example, the 30 year fixed rate loan would have a monthly payment of \$1,089.07, for a total amount of $\$1,089.07 \times 360 = \$392,065.20$ making the total interest paid over the entire loan be $\$392,065.20 - \$229,500 = \$162,565.20$.
 - For the example, the 15 year fixed rate loan would have a monthly payment of \$1,579.38, for a total amount of $\$1,579.38 \times 180 = \$284,288.40$ making the total interest paid over the entire loan be $\$284,288.40 - \$229,500 = \$54,788.40$.
7. **Additional Monthly Payment.** This is the somewhat tedious part and when applying for a loan, most of the banks or credit unions will do some or all of this for you; but it is good to know what they are doing and why. They often don't tell you what these amounts are, or where the numbers come from.
- Hazard Insurance.** You'll need to calculate the insurance that you must pay on the home. Call an insurance agent and find out the yearly cost of insuring your home. Tell me which company you chose and why you chose it, as well as the total yearly cost for insurance (it should be about \$150 – \$200 per \$100,000 of loan). From this, calculate the monthly cost of homeowners insurance.
 - For the example, we'll use \$200 per \$100,000, which would be \$600, paid each year.
 - This is $\$600 \div 12 = \50 per month.
 - Property Tax.** You will need to determine property taxes for your new home. In Oceanside, the rate is 1.062%. Another location may be different, so check this out online. Use this to determine the annual amount of property tax and then calculate the monthly cost of property tax.
 - The home value is \$300,000, so the annual property tax is $\$300,000 \times 1.062\% = \$3,186$.
 - The monthly property tax is $\$3,186 \div 12 = \265.50 .
 - PMI.** For this project, you will be ignoring PMI. Private Mortgage Insurance is usually required if you don't put 20% down payment on the house. Because of the complexity involved with PMI, we will not include it here.

NOTE: Most experts recommend planning for repair/maintenance costs of about 2% of your home value each year. This is not included in the project but these costs need to be planned for in real life!

- iv. Add these numbers together to create your additional monthly payment. For both 15-yr and 30-yr loans, add this amount to create the total monthly payment.
- The additional monthly payment is $\$50 + \$265.50 = \$315.50$.
 - The total monthly payment for the 15-year loan is $\$315.50 + \$1,579.38 = \$1,894.88$.
 - The total monthly payment for the 30-year loan is $\$315.50 + \$1,089.07 = \$1,404.57$.

8. **Cash needed for closing (1.1).** Note about closing costs: *There are also typically fees and other charges that are known as closing costs. They can range from a few hundred dollars to more than \$10,000, so if you do go for a home loan later, closing costs will be part of your calculation. Because they vary so much from one place to another, we are not going to include them in the project.*

Most banks require an escrow account for the additional monthly payment to ensure that you pay. When you first sign for the loan, you'll need to pay the entire down payment PLUS 12 months of escrow. You also need to pay daily interest until the start of the next month – closing near the end of the month does decrease this! For the project, we'll assume that you need 15 days of interest. Calculate the simple interest for 1 day and then multiply by 15. Determine how much you will need to bring as a cashier's check to the closing of the loan. Most often, the bank requires your savings or checking account to have an additional 2 months of total monthly payments as a sign that you are not struggling financially. Assuming this is the case, how much money would you need in your account as you went to the loan signing?

- Escrow amount: $\$315.50 \times 12 = \$3,786$
- 30 year information:
 - Daily interest (30 yr): $I = P \cdot r \cdot t = 229,500(0.0395) \frac{1}{365} \approx \24.84
 - 15 days of daily interest (30 yr): $15 \times \$24.84 = \372.60
 - Total amount needed for closing (30 yr): $\$25,500 + \$3,786 + \$372.60 = \$29,658.60$
 - 2 extra payments (30 yr): $2 \times \$1,404.57 = \$2,809.14$
 - Amount needed in my account (30 yr): $\$29,658.60 + \$2,809.14 = \$32,467.74$
- 15 year information:
 - Daily interest (15 yr): $I = P \cdot r \cdot t = 229,500(0.0295) \frac{1}{365} \approx \18.55
 - 15 days of daily interest (15 yr): $15 \times \$18.55 = \278.25
 - Total amount needed for closing (15 yr): $\$25,500 + \$3,786 + \$278.25 = \$29,564.25$
 - 2 extra payments (15 yr): $2 \times \$1,894.88 = \$3,789.76$
 - Amount needed in my account (15 yr): $\$29,564.25 + \$3,789.76 = \$33,354.01$

9. **Which Loan 15-yr or 30-yr?** Based on your calculations, which loan option would you choose – the 15 year or the 30 year. Explain your reasoning for choosing this option.
- The 15 year loan for the example is too expensive as the monthly payment is more than \$1,550 so we wouldn't qualify for that loan.
 - The 30 year loan is under the maximums, so I would choose that option.

Note: Please consider the 30-year mortgage even if you can afford the 15-year. The reason is that you can always pay more on a loan, but you can't pay less than the minimum total monthly payment. If you chose the 15-year mortgage and then had some financial emergencies (unforeseen car/doctor bills, or a divorce, marriage, or children, etc.) and couldn't afford the payment anymore, you would be out of luck and have to sell or refinance, which means more money. Choosing the 30-year loan would help you with these problems if they surfaced and with the higher interest rate on the 30-year, it means that you could be able to deduct more on your taxes at the end of the year (probably) compared to the 15-year loan.

PART 3 – CREATING AMORTIZATION SCHEDULES

10. **Pay for the home (1.5).** Now that you have chosen your home loan, you will make up an amortization schedule on the computer using a spreadsheet. You will create this yourself; any amortization schedules from web sites or other computer programs will be given **NO CREDIT**. *An informational page is posted on Blackboard (or the website) but there will be time in class to create the amortization schedule.* Make sure that it includes all relevant information (Payment Number, Total payment, escrow, P & I payment, interest, principal, remaining balance, and loan ratio). Consider these things:
- First, your last payment on the loan should bring the amount to \$0.00 as a balance.
 - Second, anything involving money in your printouts should be treated as money; make sure you format the cells as currency, not as a number.
 - Third, your printouts could be in slightly smaller font, and slightly bigger margins to save paper (don't go below 10 point font with 0.6" margins).
 - Lastly, put gridlines in your printouts to make it easier to read and more professional looking. Attach these printouts as an attachment to your project, label the attachment (typing labels as a header looks very nice), and refer to it in your main project. Your printout for part 10 will include the aforementioned amortization schedule as well as a summary box below the amortization schedule that shows the total amount of interest paid. How much total interest does the spreadsheet show for the loan you chose?
11. **Pick again:** Whichever loan you chose in #10, do the other type here. It is easiest to do this if you copy the tab in the spreadsheet and just tweak the numbers. If you picked the 30 year loan, do the 15 year loan here and remember the interest rate changes. Repeat the same concept as above.
- How much interest would you save by doing the 15 year loan instead of the 30 year loan?
12. **Hybrid option:** Copy the 30 year loan to a new tab and change the total payment to be the 15-year payment. Determine the following:
- How long would it take you to pay off the loan with the new payment?
 - How much interest would you pay when using this option?
 - Explain the savings on this in terms of time and money.
13. **Pay a bit more:** You could find an extra \$50 per month once you have your job (rent a Redbox vs. theater). How much less interest is there if you put an extra \$50 per month on the loan you chose in #10? Copy that tab and increase the total payment by \$50 each month. Determine the following:
- How long would it take to pay off the home now?
 - Would you do this with the \$50 or not?
 - Explain the savings on this in terms of time and money.

For the spreadsheets, condense the length of the amortization schedule in Excel by hiding the rows that don't show major changes – these will each end up at around ½ page instead of 6+ pages.

NOTE: *For those of you wanting an ARM (Adjustable Rate Mortgage), you can't use that type of loan on the project because of the uncertainty and increased complexity. If you do pick one in real life, I suggest planning for the rate to increase at least 2-3 times by 0.50%. Failure to plan in this way may lead to foreclosure; sadly, this was reality for thousands of homeowners across America from 2005 to 2014. ARM's come in many forms such as a 3/1 ARM, a 5/1 ARM, and now a 5/5 ARM, etc. These keep a lower rate fixed for the first number of years and then allow for the rate to adjust after that. Example: a 3/1 ARM fixes the low rate for 3 years and then allows an increased rate each year after that. The interest rate for the initial period is often below the prime rate; rising rates could result in way higher payments.*

PART 4 – PLANNING FOR RETIREMENT

14. **\$\$ at retirement (1.2/1.7):** In the previous parts of the project, you have described a job you hope to have as a career. Now we need to start planning for retirement. We should assume that costs increase by a fixed percentage each year called inflation. In order to include this in our calculations, we need to have our retirement paychecks include a cost of living adjustment or COLA. Further, you should assume that your retirement income earns 6% annual interest compounded monthly. Some of you may earn more than this in your accounts, but this is conservative and will at least provide a good estimate.
- Decide if you want to assume inflation of 2% to 4% – your choice. Riskier = 2%, safer = 4%.
 - Decide how much you could comfortably live on **now** each month and state why.
 - Calculate how much money you would need once you retire to have the same value each month using the inflation figure from part (a). [Use the compound interest formula.]
 - Decide how long you think you'll remain 'retired'. Use your family history to determine average age for your family; if this doesn't work for you, consult age tables provided by the US Census Bureau to estimate how long you'll need to plan for retirement.
 - Finally, use the COLA formula to calculate how much money you'll need to have at retirement in order to have enough money to last through your retirement. Show the formula and the result.
15. **How to get the money for retirement (1.3):** Now that you know how much you'll need at retirement, you'll need to know a few things about investing now.
- Determine approximately how old you'll be when you start the job you described in part 1.
 - Determine how long (in years) you'll be investing before you actually retire.
 - Using 7% annual interest compounding monthly, calculate how much you'll need to invest each month to meet your retirement goals.
 - Those of you working for a company (not self employed) may have a company match part of your contribution into this account. I strongly urge you to consider this as a great option since it is basically free money. Take this into consideration if you have the information from your job.
16. **Summarize:** When you finish all of this, determine the following.
- How much total did you pay into the retirement account?
 - Determine the total payout from the COLA payout annuity.
 - Use these two amounts to find the total interest you ended up earning over the entire length of time – from starting investing until retirement account runs out of money.
17. **Invest now or wait?** Recalculate the values for #15 assuming that you wait 5 extra years before you begin investing for retirement, but that your retirement is the same length of time. Answer the questions below. For this situation, assume that you still need the same amount when you retire;
- How much total did you pay into the retirement account?
 - How much more did you pay than in the original #16 above?
 - Determine the total payout from the new COLA payout annuity.
 - Use these two amounts to find the total interest you ended up earning over the entire length of time – from starting investing until retirement account runs out of money.
 - Why do people say start investing early? Explain your results.

PART 5 – PROJECT RECAP AND COMMENTS

18. **Look Back:** On a separate page at the back of your project, include your comments about this project. What did you learn, if anything? Do you feel more confident with financial decisions? Do you feel that it was beneficial? What would you change about it for the future?