

Finance Chapter Project – “**Buying A House**”
MATH 1332, College Mathematics

Name _____
Due: _____

You are thinking about buying a house. To determine if this is feasible, you need to perform some calculations. Make sure to show all of your work, especially how the formulas are set up. You need to write something down for every part of each question.

1) Use the first three pages as a coversheet, and attach it to your project. Please do not write in the blanks beside the numbers. Make sure your name is on the top of the page.

You need to save for a down payment. To find out how much you can save, you need to gather some income and savings information.

2a) What is your **gross annual income**? Every year, the U.S. Department of Housing and Urban Development (HUD) publishes the median family incomes (MFI) for various areas around the country. A chart with the latest HUD figures is located in D2L. Let's assume that you have graduated and you have just landed a really good job. However, since you have little to no experience, your income may be lower than average, so let's choose 80% Median Income. Pick your family size and use the income listed in the chart for the city/county where your future home is located. (Remember, if you pick a larger family size, you will need to choose a larger house to accommodate your family, so don't just pick a family size because it has a higher income figure). Make sure to indicate your family size. You can also visit the HUD webpage at:

2b) You need to calculate your **net annual income**. To keep things simple, we will say that taxes will be 25% of your gross income. So, $\text{Gross Income} - (0.25 \times \text{Gross Income}) = \text{Net Annual Income}$.

2c) Suppose you decide to save 10% of your **net monthly income**. Find this amount.

2d) If you invest this money in an account that compounds monthly with an APR of 2.5%, how much will you have saved *i*) after 1 year? *ii*) after 3 years?

Before you buy a house, you need to determine what you can afford.

3) The bank will not approve your mortgage loan if your monthly payment is greater than 28% of your **gross monthly income**. Find the maximum amount you can pay each month for your mortgage. Give a calculation to show that you can afford your mortgage.

Now we get to the fun part. Happy house hunting!

4) Find a house on the market. Remember that you need to have enough space for the entire family (that does not mean that every child must have his/her own room, but you can't put grandma in with the kids! Just be reasonable.) Print or cut out the advertisement to attach to your project.

___/3 5) Determine your down payment. For this project, select an amount that is 10% of the price of the home.

___/3 6) Did your savings plan save enough for the down payment after 3 years? If not, then decide how you will adjust your savings plan either by extending the time you are saving or by increasing the amount each month to ensure you have enough for the down payment.

___/4 7) How much of the house must be financed, i.e., after you make your down payment (see #5), how much of the cost of the house is still unpaid? This is your loan amount.

___/6 8) Find the rates of two fixed mortgages, one with a term of 30 years, and one with a term of 15 years. Some lenders quote two different rates. Choose the rate labeled APR. Once you have found your rates, print out documentation of where you found your rates to attach to your project. Circle, highlight, or otherwise indicate the rate you choose. (Note: Rates on some websites change daily. Print out your documentation on the same day you choose the rate to make your calculations.)

___ 9) For the loan with the 30 year term, find the following:

___/6 9a) Calculate the monthly payment. (Show your work. You may NOT use an online mortgage calculator. This applies to #10a as well!)

___/4 9b) Calculate the total amount paid for the loan.

___/4 9c) Calculate the total interest paid for the loan.

___ 10) For the loan with the 15 year term, find the following:

___/6 10a) Calculate the monthly payment.

___/4 10b) Calculate the total amount paid for the loan.

___/4 10c) Calculate the total interest paid for the loan.

BUT...the mortgage is not the only monthly cost you need to consider. You will also have to pay property taxes and homeowner's insurance for your house.

___/5 11) The property taxes should be stated on the real estate listing of the house. If not, try googling your property address to find another listing for the same property, or you can try calling the realtor. Divide the amount of property taxes by 12 to get your monthly tax payment.

___/5 12) There are a number of things, such as size, age, number of stories, and location that can affect the cost of homeowner's insurance, but valuation of the home for insurance purposes

usually runs between \$80 - \$100 per square foot. To calculate a rough estimate, divide the purchase price (not the loan amount!) of the home by 1000 and multiply by \$4. This gives you the annual premium. Divide by 12 to get your monthly insurance payment.

- ___/4 13a) What is the total monthly payment on the 30 year loan, including taxes and insurance?
- ___/4 13b) Is the monthly payment on the loan with the 30 year term within your budget? If not, adjust your down payment, or find a cheaper house. If you have to adjust your down payment, determine how you will adjust your savings plan. If you need a cheaper house, print out the advertisement for the new house and calculate the new monthly payment.
- ___/4 14a) What is the total monthly payment on the 15 year loan, including taxes and insurance?
- ___/4 14b) Is the monthly payment on the loan with the 15 year term within your budget? If not, adjust your down payment, find a cheaper house, or choose the 30 year term. If you choose to adjust your down payment or find another house, then adjust your savings plan or find the new monthly payment, respectively.
- ___/5 15) Write a paragraph where you determine which loan is better for your financial position. Explain your reasons for making your decision. You should address each of the following points. Which monthly payment will be easier to make? Which loan costs less in the long run? Which loan will allow you to get the better house?

NOTE: Up to 10 points may be deducted for work that is messy, disorganized, or difficult to read. Your project should contain:

- 1) This coversheet
- 2) Documentation showing where you found your interest rates.
- 3) Documentation showing the details of the house(s) you are looking to buy.
- 4) Your work showing all of your calculations, including the formulas used to calculate each amount. Write down each formula you use and **then** show the formula with all of the variables filled in with the appropriate values. This should also contain your paragraph about your decision.

REMEMBER TO READ ALL INSTRUCTIONS CAREFULLY. IF YOU HAVE ANY QUESTIONS, OR SOMETHING IS NOT CLEAR TO YOU, ASK!

2018 HUD median income for Texas counties

(following values taken from: <https://sites.google.com/site/texasmortgage/limits/2018-hud-median-income-limits>)

2018 HUD median income limits - 80%

County Name	Area Income	1 Person	2 People	3 People	4 People	5 People	6 People	7 People	8 People
Anderson County	53,700	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Andrews County	86,300	42,500	48,550	54,600	60,650	65,550	70,400	75,250	80,100
Angelina County	57,800	32,400	37,000	41,650	46,250	49,950	53,650	57,350	61,050
Aransas County	54,000	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Archer County	62,900	35,250	40,250	45,300	50,300	54,350	58,350	62,400	66,400
Armstrong County	66,500	37,250	42,600	47,900	53,200	57,500	61,750	66,000	70,250
Atascosa County	60,100	33,700	38,500	43,300	48,100	51,950	55,800	59,650	63,500
Austin County	72,400	40,550	46,350	52,150	57,900	62,550	67,200	71,800	76,450
Bailey County	50,100	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Bandera County	66,800	37,450	42,800	48,150	53,450	57,750	62,050	66,300	70,600
Bastrop County	86,000	48,200	55,050	61,950	68,800	74,350	79,850	85,350	90,850
Baylor County	62,500	34,550	39,500	44,450	49,350	53,300	57,250	61,200	65,150
Bee County	49,000	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Bell County	59,700	33,450	38,200	43,000	47,750	51,600	55,400	59,250	63,050
Bexar County	66,800	37,450	42,800	48,150	53,450	57,750	62,050	66,300	70,600
Blanco County	72,400	40,550	46,350	52,150	57,900	62,550	67,200	71,800	76,450
Borden County	84,400	41,750	47,700	53,650	59,600	64,400	69,150	73,950	78,700
Bosque County	57,900	32,450	37,050	41,700	46,300	50,050	53,750	57,450	61,150
Bowie County	52,200	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Brazoria County	91,100	50,350	57,550	64,750	71,900	77,700	83,450	89,200	94,950
Brazos County	73,900	37,700	43,050	48,450	53,800	58,150	62,450	66,750	71,050
Brewster County	56,300	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700

Briscoe County	53,900	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Brooks County	28,000	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Brown County	53,300	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Burleson County	73,900	37,700	43,050	48,450	53,800	58,150	62,450	66,750	71,050
Burnet County	62,700	35,150	40,150	45,150	50,150	54,200	58,200	62,200	66,200
Caldwell County	86,000	48,200	55,050	61,950	68,800	74,350	79,850	85,350	90,850
Calhoun County	65,700	36,800	42,050	47,300	52,550	56,800	61,000	65,200	69,400
Callahan County	63,900	35,000	40,000	45,000	50,000	54,000	58,000	62,000	66,000
Cameron County	38,900	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Camp County	45,200	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Carson County	66,500	37,250	42,600	47,900	53,200	57,500	61,750	66,000	70,250
Cass County	50,500	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Castro County	44,700	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Chambers County	74,900	41,950	47,950	53,950	59,900	64,700	69,500	74,300	79,100
Cherokee County	50,000	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700

Childress County	59,800	33,500	38,300	43,100	47,850	51,700	55,550	59,350	63,200
Clay County	62,900	35,250	40,250	45,300	50,300	54,350	58,350	62,400	66,400
Cochran County	45,400	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Coke County	64,600	36,200	41,400	46,550	51,700	55,850	60,000	64,150	68,250
Coleman County	44,900	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Collin County	77,200	43,250	49,400	55,600	61,750	66,700	71,650	76,600	81,550
Collingsworth County	48,400	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Colorado County	59,900	33,550	38,350	43,150	47,900	51,750	55,600	59,400	63,250
Comal County	66,800	37,450	42,800	48,150	53,450	57,750	62,050	66,300	70,600
Comanche County	45,400	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Concho County	58,600	35,750	40,850	45,950	51,050	55,150	59,250	63,350	67,400
Cooke County	64,900	36,350	41,550	46,750	51,900	56,100	60,250	64,400	68,550
Coryell County	59,700	33,450	38,200	43,000	47,750	51,600	55,400	59,250	63,050
Cottle County	45,800	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Crane County	72,900	40,850	46,650	52,500	58,300	63,000	67,650	72,300	77,000
Crockett County	65,500	36,700	41,950	47,200	52,400	56,600	60,800	65,000	69,200
Crosby County	63,200	35,400	40,450	45,500	50,550	54,600	58,650	62,700	66,750
Culberson County	43,700	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Dallam County	49,200	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Dallas County	77,200	43,250	49,400	55,600	61,750	66,700	71,650	76,600	81,550
Dawson County	53,600	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Deaf Smith County	53,700	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Delta County	55,000	33,900	38,750	43,600	48,400	52,300	56,150	60,050	63,900
Denton County	77,200	43,250	49,400	55,600	61,750	66,700	71,650	76,600	81,550
DeWitt County	68,100	37,950	43,350	48,750	54,150	58,500	62,850	67,150	71,500
Dickens County	55,700	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700

Dimmit County	47,400	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Donley County	53,100	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Duval County	43,700	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Eastland County	46,200	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Ector County	75,300	40,700	46,500	52,300	58,100	62,750	67,400	72,050	76,700
Edwards County	60,900	33,850	38,650	43,500	48,300	52,200	56,050	59,900	63,800
Ellis County	77,200	43,250	49,400	55,600	61,750	66,700	71,650	76,600	81,550
El Paso County	51,700	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Erath County	56,200	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Falls County	51,700	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Fannin County	57,500	32,200	36,800	41,400	46,000	49,700	53,400	57,050	60,750
Fayette County	65,200	36,550	41,750	46,950	52,150	56,350	60,500	64,700	68,850
Fisher County	56,600	31,850	36,400	40,950	45,450	49,100	52,750	56,400	60,000
Floyd County	51,200	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Foard County	52,200	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Fort Bend County	74,900	41,950	47,950	53,950	59,900	64,700	69,500	74,300	79,100
Franklin County	60,300	34,250	39,150	44,050	48,900	52,850	56,750	60,650	64,550
Freestone County	58,400	32,700	37,400	42,050	46,700	50,450	54,200	57,950	61,650
Frio County	42,800	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700

Gaines County	64,900	36,350	41,550	46,750	51,900	56,100	60,250	64,400	68,550
Galveston County	74,900	41,950	47,950	53,950	59,900	64,700	69,500	74,300	79,100
Garza County	56,800	31,850	36,400	40,950	45,450	49,100	52,750	56,400	60,000
Gillespie County	71,000	39,800	45,450	51,150	56,800	61,350	65,900	70,450	75,000
Glasscock County	103,100	48,800	55,800	62,750	69,700	75,300	80,900	86,450	92,050
Goliad County	69,600	38,850	44,400	49,950	55,450	59,900	64,350	68,800	73,200
Gonzales County	53,500	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Gray County	58,200	32,600	37,250	41,900	46,550	50,300	54,000	57,750	61,450
Grayson County	65,200	36,550	41,750	46,950	52,150	56,350	60,500	64,700	68,850
Gregg County	59,400	33,250	38,000	42,750	47,500	51,300	55,100	58,900	62,700
Grimes County	61,100	34,250	39,150	44,050	48,900	52,850	56,750	60,650	64,550
Guadalupe County	66,800	37,450	42,800	48,150	53,450	57,750	62,050	66,300	70,600
Hale County	49,800	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Hall County	35,900	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Hamilton County	59,600	33,400	38,200	42,950	47,700	51,550	55,350	59,150	63,000
Hansford County	56,900	32,350	36,950	41,550	46,150	49,850	53,550	57,250	60,950
Hardeman County	52,700	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Hardin County	64,600	34,650	39,600	44,550	49,450	53,450	57,400	61,350	65,300
Harris County	74,900	41,950	47,950	53,950	59,900	64,700	69,500	74,300	79,100
Harrison County	56,400	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Hartley County	73,000	40,900	46,750	52,600	58,400	63,100	67,750	72,450	77,100
Haskell County	53,600	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Hays County	86,000	48,200	55,050	61,950	68,800	74,350	79,850	85,350	90,850

Hemphill County	70,000	39,200	44,800	50,400	56,000	60,500	65,000	69,450	73,950
Henderson County	59,600	33,400	38,200	42,950	47,700	51,550	55,350	59,150	63,000
Hidalgo County	40,300	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Hill County	54,500	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Hockley County	62,900	35,250	40,250	45,300	50,300	54,350	58,350	62,400	66,400
Hood County	70,200	39,350	44,950	50,550	56,150	60,650	65,150	69,650	74,150
Hopkins County	56,100	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Houston County	47,200	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Howard County	63,000	35,300	40,350	45,400	50,400	54,450	58,500	62,500	66,550
Hudspeth County	29,700	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Hunt County	77,200	43,250	49,400	55,600	61,750	66,700	71,650	76,600	81,550
Hutchinson County	62,100	34,800	39,800	44,750	49,700	53,700	57,700	61,650	65,650
Irion County	64,800	36,300	41,500	46,700	51,850	56,000	60,150	64,300	68,450
Jack County	62,000	34,750	39,700	44,650	49,600	53,600	57,550	61,550	65,500
Jackson County	71,400	40,000	45,700	51,400	57,100	61,700	66,250	70,850	75,400
Jasper County	58,200	32,600	37,250	41,900	46,550	50,300	54,000	57,750	61,450
Jeff Davis County	64,700	36,250	41,400	46,600	51,750	55,900	60,050	64,200	68,350
Jefferson County	64,600	34,650	39,600	44,550	49,450	53,450	57,400	61,350	65,300
Jim Hogg County	45,400	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Jim Wells County	56,000	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Johnson County	75,200	42,150	48,150	54,150	60,150	65,000	69,800	74,600	79,400
Jones County	63,900	35,000	40,000	45,000	50,000	54,000	58,000	62,000	66,000
Karnes County	60,900	34,100	39,000	43,850	48,700	52,600	56,500	60,400	64,300

Kaufman County	77,200	43,250	49,400	55,600	61,750	66,700	71,650	76,600	81,550
Kendall County	93,400	50,350	57,550	64,750	71,900	77,700	83,450	89,200	94,950
Kenedy County	54,800	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Kent County	63,100	35,350	40,400	45,450	50,500	54,550	58,600	62,650	66,700
Kerr County	58,400	32,700	37,400	42,050	46,700	50,450	54,200	57,950	61,650
Kimble County	54,800	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
King County	81,400	41,800	47,800	53,750	59,700	64,500	69,300	74,050	78,850
Kinney County	48,600	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Kleberg County	49,200	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Knox County	53,500	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Lamar County	53,400	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Lamb County	50,100	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Lampasas County	61,600	34,550	39,450	44,400	49,300	53,250	57,200	61,150	65,100
La Salle County	44,000	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700
Lavaca County	60,000	33,600	38,400	43,200	48,000	51,850	55,700	59,550	63,400
Lee County	66,900	37,450	42,800	48,150	53,500	57,800	62,100	66,350	70,650
Leon County	63,400	35,500	40,600	45,650	50,700	54,800	58,850	62,900	66,950
Liberty County	74,900	41,950	47,950	53,950	59,900	64,700	69,500	74,300	79,100
Limestone County	40,100	31,650	36,200	40,700	45,200	48,850	52,450	56,050	59,700