

Mathematical Explorations

Math in the Real World

Board of Trustees Meeting
Jan. 23, 2017

* History

* MTA - Math Pathways

* Textbook

*Topics Covered

*Problem Solving

- * Percents, Dimensional Analysis, Logic, Geometry

*Finance

- * Personal Budget, Investing Money, Borrowing Money, Inflation, Taxes

*Growth Models

- * Linear, Exponential, Models & Correlation

*Probability and Statistics

* Sample - Logic

* *There are three cannibals and three missionaries. All six people are on one side of a river and must get to the other side. There is one boat that holds either one or two people. If, at any time, the cannibals outnumber the missionaries, they will eat the missionaries. Your job is to get all six people safely across the river.*

*Sample - Retirement

*Suppose you are 30 years old and would like to retire at age 60. Furthermore, you would like to have a retirement fund from which you can draw an income of \$100,000 per year - forever! How can you do it? Assume a constant APR of 6%.

* Sample - Lottery Tickets

*The table gives recent prizes and probabilities of winning (on a single \$1 ticket) for the Multi-State Powerball lottery. Find the expected value of the winnings for a single lottery ticket, given the following grand prizes. Then state how much you can expect to win or lose if you spend \$365 per year on the lottery.

Prize	Probability
\$10,000,000	1 in 175,223,510
\$1,000,000	1 in 5,153,633
\$10,000	1 in 648,976
\$100	1 in 19,088
\$100	1 in 12,245
\$7	1 in 360
\$7	1 in 706
\$4	1 in 111
\$4	1 in 55

* Sample - Personal Finance

* LIFE Scenario #2: Ana

* Good day, Ana. This is the story of your life. Remember back in grade school when you were asked, "What do you want to be when you grow up?" Let's see if you stayed with that dream or if your life took a different path.

Grade school dream job: Doctor

* At age 18 - Ana, you are about to graduate high school...

* At age 25 - Ana, you have graduated from college ...

* At age 35 - Ana, you are still making good money ...

* At age 45 - Ana, you are still paying off the credit card ...

* At age 55 - Ana, your life seems to have taken a ...

* At age 65 - Ana... you are retired... Are you pleased with how your life turned out?



Dream House

Olivia Flores



Brigham Dr., Grand Haven MI 49417

\$201,900

20% Down Payment (\$40,330)

Loan = \$161,570

3 Bedroom

2 Bath

1600 sq ft

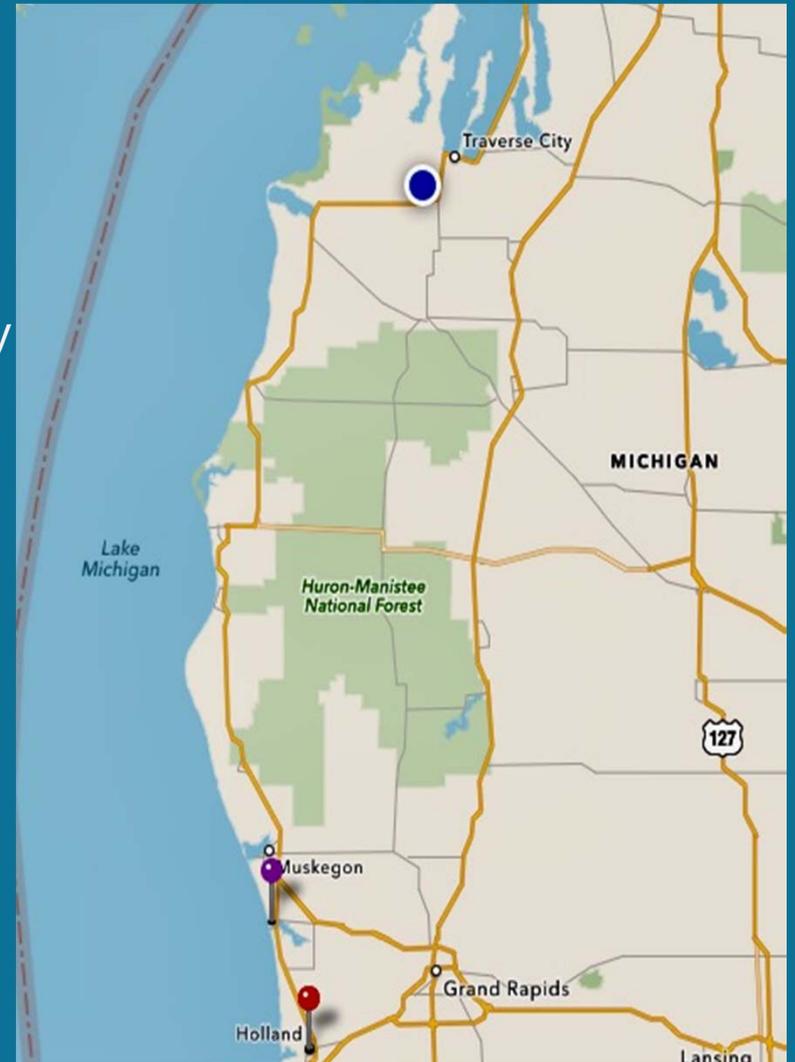
Not Yet Built!

This is my dream house because...

Location: Between
Holland and Traverse City
Close to Lk. Michigan

Jobs: Welding Jobs

School: 45 minutes away
in Grand Rapids





House Payments

Monthly Payment = **\$968.69**

Monthly Interest Rate = .005%

Amount of FIRST month's house payment that goes towards:

Interest on Loan = \$807.85 (83%)

Paying off Principle = \$160.84 (16.6%)

Total Amount paid for Loan = \$348,480

Total Interest = \$186,910 (53%)

30 years Later

Total Amount Paid for House, WITH Down Payment = \$388,810

Worth= \$654,841.95

You would not pay more for the house than what it will be worth after 30 years! The worth of the house will nearly triple!

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Mathematical Investigations - MTH 120

Sample - Logic

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Sample - Personal Finance

LIFE Scenario #2: Ana

Good day, Ana. This is the story of your life. Remember back in grade school when you were asked, “What do you want to be when you grow up?” Let’s see if you stayed with that dream or if your life took a different path.

Grade school dream job: Doctor

At age 18 - Ana, you are about to graduate high school with a very strong GPA 3.8/4.0. You’ve always focused on college and made the right decisions to have many college choices. You’ve been accepted into numerous universities and can choose numerous career paths. You still want to be a doctor; but are wondering whether you can afford all of the required education and it’ll take like 8 years of more school. Maybe you should just be a nurse instead?

At age 25–Ana, you have graduated from college. You decided to become a physical therapist which required you to stay in school and get a master’s degree in addition to your undergraduate degree. You’ve been hired to work at a clinic in Dallas, Texas and you’ll be making almost \$65,000 to start. Unfortunately, you’ve got over \$100,000 in school loans to pay for; but your career has just started. With your new job, you’re eligible for a new home loan right away and you are getting credit card offers from everywhere. There is virtually nothing you cannot buy. You are young and making good money, you have no trouble finding men who want date you.

At age 35–Ana, you are still making good money as a physical therapist (now over \$75,000/year); but you are struggling financially. At 26, you bought a BMW convertible, and at 27, you bought a 3 bedroom house with nice back yard. You installed a new swimming pool and used your credit cards to fill the house full of furniture. You hosted a party where one of your “friends” fell off your diving board and cracked his head on the concrete by your pool. He sued you for negligence and this is when you found out that your insurance was never updated to include coverage for the pool. You got a huge bill for this mistake. Your “friend” agreed to drop his lawsuit against you for \$80,000 –cash. You didn’t have the money; so you had to borrow it from your employer since you had maxed out all your credit cards and had no equity in your house. No one will loan you money and you had no idea how much it really costs to keep a pool clean –you hardly ever swim in it anyway and you’ll never throw another party. You were about to get married; but your boyfriend decided he didn’t want to take on all your debts and broke up with you.

At age 45 - Ana, you are still paying off the credit card bills for things you bought in your late 20s. You now make over \$100,000 per year as a physical therapist; but are still struggling financially. You are single; but rarely have the time or energy to date anyone. You have three cats who keep you company. You hope to be able to travel with your girlfriends; but most of them are now married with kids. Going to see someone else’s kids play soccer is not all that much fun for you.

At age 55 - Ana, your life seems to have taken a positive turn. Since you’ve always had a strong income, you were able to finally get your credit cards paid off. You had a brief scare when you were diagnosed with breast cancer at age 46, but your medical insurance paid for the treatment and you’ve fully recovered. Once your financial situation cleared and you got all those old credit cards paid off (20 years later), you started to investigate philanthropy (ways to give back to the community). You raised money for cancer research and at a fund raiser met a very nice man who you eventually married at age 50. You enjoy travelling and hiking.

At age 65 - Ana, you are retired. Your husband had always been a good investor into a retirement benefits program at his work and you both will be able to live off of these investments and not work. You have some savings which you started in your mid fifties. The weather in Dallas is just too hot; so you want to retire somewhere else. Where should you move?

Are you pleased with how your life turned out?

Would you go back and change anything?