

MAT 101 Spring 2020
Final Exam

Part I: Computational Skills

1. Compute $\frac{1}{3} + (2 - 7)^2 - \frac{5}{8} \times 2$
2. Substitute $x = 3$ into the expression $2x^2 - 3x + 1$
3. Determine whether $x^2 - 9x + 20$ and $(x - 4)(x + 5)$ are equivalent expressions.
4. Solve the equation $2(x+3) - 8 = -12$

Part II: Applied Problems

1. Fractions, Decimals, Ratios and Percentages

- a. Stores that are open are currently required to limit the number of customers to 20% of their usual capacity. The current maximum capacity at the Hartsville Lowe's is 150 customers. What is the usual capacity?
- b. According to a study conducted by Dr. Granger, approximately 22% of customers at the Hartsville Lowe's are following the CDC's recommendation to wear a mask while in public conducting essential business. If the store is at capacity, how many customers are wearing a mask?
- c. Lowe's sells quick setting cement, which is mixed by adding 1 gallon of water to every 50 lbs bag of cement powder.
 - i. How much water, in cups, would you need for 20 lbs of powder?
 - ii. How much water, in gallons, would you need for 5 bags of powder?



2. Visual Displays

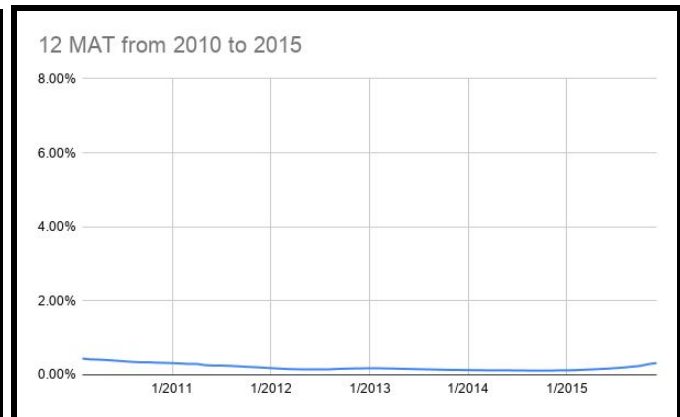
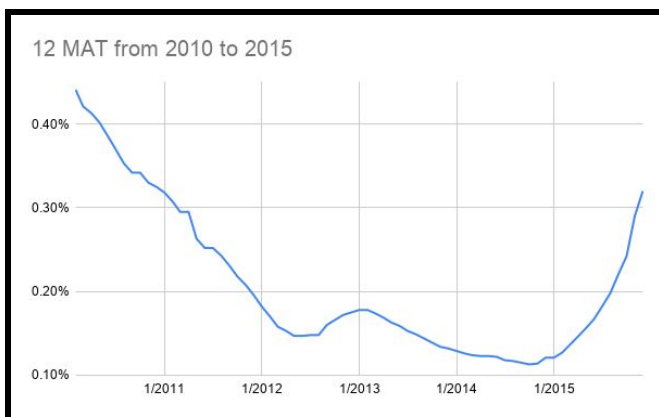
- a. The pie chart pictured was used on the nightly news to show the breakdown of funding sources for an arena for the Sacramento Kings built in California. The Maloofs are a wealthy majority owner of the team, and AEG is an entertainment company.



- i. What percentage of the funding is coming from unknown sources?

- ii. Is the pie chart a good way to represent this data, or is it misleading in some way? Fully explain your reasoning.

- b. The graphs below both show the same data, which is a financial index called the “12 MAT”, from the period of 2010 to 2015. The 12 MAT is used to calculate interest rates on adjustable rate mortgages, and can range anywhere from 0.10% to almost 9%, with a historical average of 3.6%. Which graph do you think gives a better representation of 12 MAT from 2010 to 2015? Fully explain your answer.



3. Functions and Growth Modeling

- a. You are building a 12 inch deep raised vegetable garden, and are trying to determine the cost for bags of soil. The garden will be 4 feet wide, and you can decide how long to make it. Let x represent the length.

- i. Write a function for the volume of the raised bed. Recall that the volume of a rectangular prism is length $\times$ width $\times$ height.



- ii. Each bag of soil fills 1.5 cubic feet, and costs \$4.98. Write a function for the cost of the soil to fill your 4 by x raised bed.
- iii. How much will it cost to fill a 4 x 8 raised bed?
- iv. If your budget for soil is \$160, what size should you make your garden? Round to the nearest foot.

4. Financial Literacy

- a. The average starting salary in South Carolina for a college graduate is \$37,000/year, and the average insurance premium is \$3852/year. Fill in the table below to calculate the take home pay:

List salary:		A
Standard Deduction: Box A - \$12,200		B
Calculate taxes from 10% bracket: 10% of \$9700		C
Calculate remaining taxable income: Box B - \$9700		D
Calculate taxes from 12% bracket: 12% of Box D		E
Calculate Total Tax burden: Box C + Box E		F
List Average Ins. Premium		G
Take Home Pay: Box A - Box F - Box G		

- b. Fill in the most important budget categories in the table below, using your take home pay from part a as a starting point.

Monthly Budget	
Housing (25%)	
Transportation (15%)	
Food (15%)	

- c. College graduates typically have student loan debt, and the average for South Carolina is \$30,891. Use the [Amortization Calculator](#) with an interest rate of 5.8% and a term of 10 years to find the average monthly student loan payment.
- d. Again referencing the same student loan, how much interest will you end up paying by the time you pay the loan off?