

MATERIAL REFERENCE: Theme 2; Units 2 (A, B and C), 3 (A and C) and 4 (A, B, C and D)

The following document outlines the knowledge presented in Theme 2 that is likely to be seen on your upcoming test. It is listed in the order of the text (not necessarily the order presented in class or on the test). **Blue items (marked CT) are critical thinking questions** and **red items (marked SA) are short answer**. You will either be provided with an example problem or will be referred to a list of book exercises for an example problem.

Your instructor may not assess all outcomes as they appear here, but will not add any questions without written notice to you.

FORMULAS: The following formula box will be provided at the top of the test

$$I = P \times r \qquad A = P \left( 1 + \frac{APR}{n} \right)^{n \cdot Y} \qquad PMT = \frac{P \left( \frac{APR}{n} \right)}{\left[ 1 - \left( 1 + \frac{APR}{n} \right)^{(-nY)} \right]}$$

LEARNING OUTCOMES:

1. **Sense of Units (Unit 2A exercises 7-12) CT.** When provided with a statement involving units, decide whether the statement is reasonable (the units provided will be familiar or you will be provided a proper conversion ratio).

*Decide whether the following statement makes sense (or is clearly true) or does not make sense (is clearly false). Be sure to explain your reasoning (and use unit conversions and mathematics to do so). The recommended amount of water for an adult is 64 ounces per day. I like to buy in bulk, so for a week I will need 24 liters. NOTE: There are 33.8 ounces in one liter.*

2. **Recipe Conversions (Unit 2A mini project 2) CT.** Given a recipe you want to convert the recipe to make as much as you can with a limiting ingredient.

*Below is Grandma’s favorite cookie recipe. You only have 9 eggs and want to make as many cookies as you can. Find the necessary amount of baking soda. Be sure to explain your reasoning.*

3. **Unit Applications (Unit 2B exercises similar to 35-42, 51-60) CT.** Solve an application problem involving units (you will be provided a conversion ratio if needed).

*The Greenland ice sheet contains about 3 million cubic kilometers of ice. If completely melted, this ice would release about 2.5 million cubic kilometers of water, which would spread out (assume evenly) over Earth’s 340 million square kilometers of ocean surface. How much would sea level rise?*

4. Find absolute and relative change (Unit 3A exercises 45-48) SA. You will be provided with an increase or decrease of a quantity over time, and asked to find the absolute and relative change. A formula for absolute and relative change will NOT be provided.

*Out of 10,000 teens ages 16-18 surveyed in 2008, 555 used marijuana on a regular basis. In 2017 the same survey reported 1,000 used the drug on a regular basis. Find the absolute and relative change between the 2008 and 2017 values.*

5. Use percentages to compare values (Unit 3A exercises 61-70) SA. You will be provided with comparative values and asked to compute the percentage increase or decrease.

*Out of 10,000 teens ages 16-18 surveyed in 2008, 555 used marijuana on a regular basis. In 2017 the same survey reported 1,000 used the drug on a regular basis. Find the percentage change between the 2008 and 2017 values.*

6. Find a grade in a class, and answer questions regarding performance (Unit 3C Mini Project 3) CT.

*The following table indicates a student's performance in a class along with the corresponding weights of their grades.*

	Percent Worth of Cumulative Grade	Student Grade (%)
Homework Average	10%	97
Mini Project Average	10%	84
Test 1	10%	75
Test 2	10%	86
Test 3	10%	25
Project 1	10%	96
Project 2	10%	91
Project 3	10%	88
Final Exam	20%	62

*Compute the student's cumulative grade in the course. Assume the student has not yet taken the final exam and wants at least a C- (70%) in the course. What do they need to earn on the final exam to earn that grade?*

7. Define accuracy and precision (Unit 3C) CT.
8. Compute absolute and relative error (Unit 3C exercises 43-54) SA. Given two values, determine the absolute and relative error between them.

*Your bathroom scale says 145 pounds when you really weigh 138 pounds. Find the relative error between the two values.*

9. Given an income and expense scenario, determine net cash flow (Unit 4A exercises 31-34, and Unit 4B Mini Project 4B) CT. You will be provided with a table of income and expense values, and will find the monthly net cash flow. Recompute that cash flow with a lottery win of a specified amount.

*The following table shows income and expenses for Bobby.*

Income	Expense	
\$2400 per month	Rent per month:	\$ 850
	Dining per week:	\$ 45
	Groceries per month:	\$ 350
	Automobile per year:	\$ 1,800
	Cell phone per month:	\$ 35

*Find Bobby's net cash flow. Bobby won \$150,000 at a casino (after taxes) and he deposited it into a savings account that paid him 1.75% per month which he withdraws each month.*

*How would this change his cash flow?*

10. You will be asked to find the simple interest for an account (Unit 4B exercises 51-54) SA.  
*You have \$10,000 in a savings account that pays 2% simple interest per year. Find the interest earned for the first year.*
11. Find the balance on an account that accrues compound interest (Unit 4B exercises 57-70) SA. Given an investment, APR, compounding rate and length of investment find the balance after maturity.  
*You have \$10,000 in a savings account that pays 2% APR compounded monthly. Find the balance on the account after 5 years.*
12. Determine home price and payment given annual salary (Unit 3A Mini Project 3 and Unit 4D) CT. Given an annual salary and loan terms, determine an appropriate price for a home, calculate the monthly payment and find the percentage of your salary that goes towards housing.  
*You live on a modest budget and your salary is \$72,000 per year. Determine a reasonable mortgage amount. Explain your reasoning. You found a bank that will loan you that amount for 15 years with an APR of 4.85%, 15% down and 1 point. What is your monthly payment? What is the cash needed at closing? What is the total amount you will pay over the life of the loan (including cash at closing)? What percentage is paid towards interest (not including any points paid)?*
13. Find payment information on a loan (Unit 4D exercises 15-24) SA. You will be provided with a principal, and loan terms (APR and number of years). Determine the monthly payment, total amount paid and the percentage paid towards interest.  
*You want to buy a \$12,000 car with no money down at a rate of 3% APR for 5 years. What is your monthly payment, total amount paid, and percentage of that total that goes to interest?*
14. Compare loan financing (Unit 4D exercises 29-32, 37-40 and 41-44 and Mini Project 4D) CT. You will be provided with a credit card/loan amount, terms and APR. You will be asked to find the monthly payments, total amount paid and total interest paid and compare that to saving each month ahead of time to purchase the item outright.  
*You want to buy your sister's pickup truck that costs \$4,800 all-in. Suppose she is offering to finance it for you if you pay her each month with no money down, and 20% APR for 2 years. What would be the monthly payment? What is the total amount paid over the life of the loan? What is she getting in interest? She also offered to hold the car for you for a year. How much would you have to save each month to be able to pay her in full?*
15. Accelerated loan payment (Unit 4D exercises 45-46) CT. You will be provided with a loan amount, APR and term, and asked to calculate your monthly payment, and then to compare this with paying the loan off early.  
*Suppose you have a bank loan of \$2,000 with an APR of 21% for 5 years. What are your required monthly payments. What if you want to pay the loan off in 1 year instead, what would your monthly payment be now? Compare the total amounts paid over the loan term in each scenario.*