UNIVERSITY OF NEVADA LAS VEGAS

Math 120
Study Guide (Theme 3)

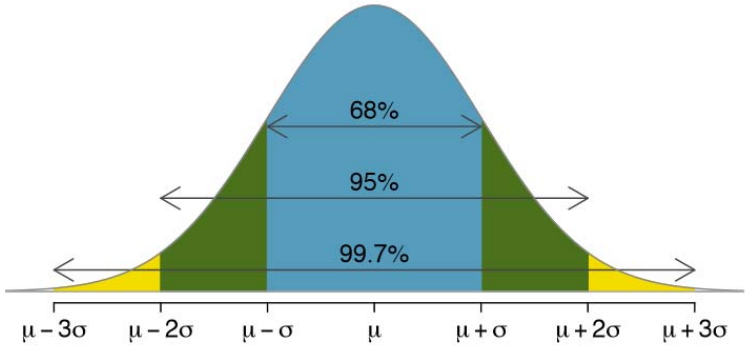
MATERIAL REFERENCE: Theme 3. Chapters 6, 8 (Units A and B) and 9 (Unit C)

The following document outlines the knowledge presented in Theme 3 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 are provided with an example problem and referred to a list of book exercises for additional question types.

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

$$z = \text{standard score} = \frac{\text{data value} - \text{mean}}{\text{standard deviation}}$$



$$Q = Q_0 \times (1+r)^t \qquad y = mx + b$$

$$\text{new value} = \text{initial value} \times \left(\frac{1}{2}\right)^{t/T_{\text{half}}} \qquad \text{new value} = \text{initial value} \times 2^{\,t/T_{\text{double}}}$$

LEARNING OUTCOMES:

1. Calculate and interpret measures of central tendency (Unit 6A exercises 13-18) SA. Find the mean, median and mode of a set of data.

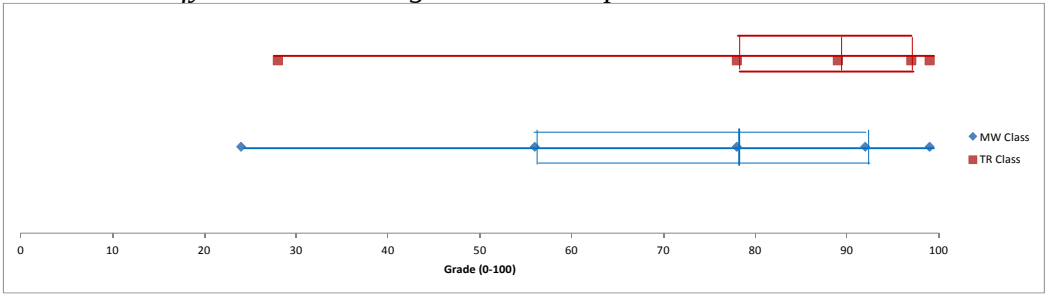
   The body temperature of randomly selected normal and healthy adults (in degrees Fahrenheit) is: 98.6, 98.6, 99.4, 98.0, 98.4. Find the mean, median and mode for the data.

2. Describe the shape of a distribution with modes, symmetry, skewness and variation (Unit 6A exercises 35-36) SA. Given information on mean, median, mode and range, identify symmetry, skewness and variation of the data.

   Consider the following results for a test in a class: 1000 students, median of 87, mean of 92, low score of 24, high score of 98. Is the data symmetric, or is it skewed right or left? Is the variation high or low? Be sure to explain your reasoning.

3. Interpret quartiles (Unit 6B) CT. Interpret a comparative boxplot of two data sets.

You heard from a student that your Tuesday/Thursday (TR) class had gotten a "sneak copy" of the test you gave to your Monday/Wednesday (MW) class. Take a look at the boxplots of the data below to verify whether this might be true. Explain.



4. Find standard deviation (Unit 6B 15-18, Mini Project 6) SA. Given a data set and mean, find the standard deviation.

Find the standard deviation for the following data: 20, 12, 16, 14, 18 (mean 16).

20		
12		
16		
14		
18		

5. Interpret standard deviation (Unit 6B exercises 21-25) CT. Given two data sets, explain what effect the standard deviation has.

Two factories each produce 1000 computer chips per day. In your factory, the mean number of defective chips per day is 3 with a standard deviation of 2.5. In your competitors' factory, the mean number of defective chips per day is 4 with a standard deviation of 0.5. Make an argument that either your factory is better, or why you need to improve based on the figures given.

6. Use the 68-95-97.7 rule to find the percentage of values in certain categories and calculate standard score (Unit 6C exercises 19, 20 and 38) SA.

A set of infant weights is normally distributed with a mean of 5 and a standard deviation of 1. Use the 68-95-99.7 rule to find the percentage of infants that weigh more than 6 pounds. What is your infants' standard score if they weigh 7 pounds?

7. Find a linear equation (Mini Project 8) CT. Given a scenario, determine a linear equation that best represents it (including slope and intercept) and analyze the effects.

You have a new job working as a bartender in a small, local bar. Your boss gives you a choice… you can earn a commission salary – a base pay of $150 per night plus $10 for every $200 in alcohol sales. Or you can earn a flat salary of simply $200 per night. Find the equation of the line that represents the commission salary on any given night. What would need to be the total sales in order for the commission salary to be more than the flat salary? Explain your reasoning.

8. Calculate with half life and doubling time (Unit 8B exercises 25-26) SA. Given the half life or doubling time, find how much of a quantity is present at a certain time.

   Right now your countertop has 1 e-coli cell. In the right environment, e-coli can double every 11 minutes. How many cells will be on your counter in 3 hours (be careful of units)?

9. Identify and find exponential models (Unit 9C, Mini Project 8) SA. Find an exponential model given a scenario.

   You are trying to increase your strength, and your trainer indicated you can increase the weight of your bench press by 10% every week. If you start by benching 20 pounds, find an equation to represent how much you will bench for any given week after that.

10. Use exponential and linear models (Unit 9, Mini Project 9) CT. Use an exponential or linear model to predict future values, and determine positive and negative aspects of the model.

    Given the exponential model in Question 9, what would be the amount you can bench after 2 years? Does this make sense, why or why not?