BAKER COLLEGE
STUDENT LEARNING OUTCOMES

MTH 1070 Quantitative Reasoning
3 Semester Credit Hours

Student Learning Outcomes and Enabling Objectives

1. Apply linear, quadratic, exponential, and logarithmic models to solve real world problems.
    a. Solve linear equations, linear inequalities, and quadratic equations.
    b. Graph linear equations and linear inequalities.
    c. Calculate values for exponential and logarithmic functions.
    d. Recognize the appropriate model for a particular set data or situation.
2. Apply the principles of probability to determine the likelihood of an outcome.
    a. Determine the number of outcomes using the Fundamental Counting Principle and formulas for combinations and permutations.
    b. Calculate probabilities related to compound events involving the connectors and, not, and or.
    c. Calculate conditional probability.
    d. Calculate the expected value in a situation involving probability.
    e. Describe the characteristics of a normal distribution.
    f. Apply the Empirical Rule to describe patterns in normally distributed data.
    g. Calculate probability from a normal distribution.
3. Apply data analysis to real world situations.
    a. Describe sampling techniques.
    b. Calculate measures of central tendency and dispersion.
    c. Graph bivariate data using a scatter plot.
    d. Describe the relationship between bivariate data values using correlation and regression.
4. Determine the choice of a group using a variety of voting methods such as Plurality, Pairwise Comparison, Approval, or the Borda Count.
    a. Describe the characteristics of various voting methods.
    b. Define the majority, monotonicity and irrelevant alternatives criterions.
5. Illustrate real world situations using mathematical structures, i.e., graphs and circuits.
    a. Identify vertices, paths and circuits in an existing graph.
    b. Recognize equivalent graphs.

c. Apply Euler's Theorem or Fleury's Algorithm to determine if an Euler path or circuit is present in a connected graph.
d. Identify Hamilton paths and circuits.
e. Develop a complete weighted graph.
f. Determine an optimal solution for a Hamilton circuit using various methods such as the Brute Force Method, Nearest Neighbor Method, or Cheapest Link Algorithm.

Big Ideas and Essential Questions

Big Ideas
- Algebraic Models
- Probability and Statistics
- Voting Methods
- Graph Theory

Essential Questions

1. How do mathematical models help me think critically about a given situation?
2. How does an understanding of probability and statistics help me make better decisions?
3. How can mathematics help me understand how group choices are made?
4. How can an understanding of graph theory help me make decisions that are efficient in real world applications?

These SLOs are not approved for experiential credit.

Effective: Spring 2022