# BAKER COLLEGE
# STUDENT LEARNING OUTCOMES

## MTH3110 Algebraic Thinking and Proportional Reasoning
## 3 Semester Hours

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### Student Learning Outcomes & Enabling Objectives

1. Apply mathematical reasoning to problem solving.
    a. Translate spoken and written language into mathematical symbols.
    b. Identify examples of inductive and deductive reasoning.
    c. Extend patterns observed in sequences of figures and numbers.
2. Apply sets to problem solving.
    a. Define a set.
    b. Identify the union and intersection of sets using a Venn Diagram or using symbolic notation.
    c. Distinguish between relations and functions.
    d. Identify the domain and range of relation or function.
    e. Recognize a relation or a function as a transformation from one set into another.
3. Complete calculations involving addition, subtraction, multiplication, and division involving real numbers.
    a. Apply various algorithms to complete arithmetic problems involving real numbers.
    b. Explain the rationale which justifies arithmetic algorithms.
    c. Apply mental math and estimation strategies to complete calculations involving real numbers.
4. Analyze basic number theory concepts related to factors, prime and composite numbers, and divisibility.
    a. Categorize whole numbers, integers, rational numbers, decimals, and real numbers.
    b. Identify prime and composite numbers.
    c. Calculate the greatest common factor and least common multiple for a pair of numbers.
    d. Find the prime factorization of a given composite number.
5. Apply proportional reasoning, specifically rates, ratios, quotients, and fractions, to problem solving.
    a. Explain the relationships between rates, ratios, quotients, fractions, decimals,

and percents.
    b. Represent proportional concepts graphically and symbolically.
    c. Write ratios and proportions to express mathematical relationships.
    d. Apply direct and indirect variation to solve problems.
6. Apply algebraic reasoning to solve real problems
    a. Represent algebraic relationships graphically, using manipulatives, and using symbols.
    b. Identify the properties of equality and inequality.
    c. Solve linear equations and inequalities, including those involving absolute value.
7. Apply statistical reasoning to describe a set of data.
    a. Differentiate between observational and experimental studies.
    b. Interpret statistical graphs and tables.
    c. Describe the characteristics of a data set using measures of central tendency.

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## Big Ideas and Essential Questions

**Big Ideas:**

- Proportional Reasoning
- Algebraic Reasoning

**Essential Questions:**

1. How does proportional reasoning help me to understanding multiplicative relationships?
2. How does algebraic reasoning help me to generalize patterns and relationships between quantities?
3. How does an understanding of equality help me to apply algebraic reasoning to solve for unknown quantities?

These SLOs are not approved for experiential credit.

**Effective: Fall 2017**