

WTCS Repository

10-804-134 Mathematical Reasoning

Course Outcome Summary

Course Information

Description This course provides an alternative pathway to earning credit for a college level liberal arts mathematics course. All college students, regardless of their college major, need to be able to make reasonable decisions about fiscal, environmental, and health issues that require quantitative reasoning skills. An activity based approach is used to explore numerical relationships, graphs, proportional relationships, algebraic reasoning, and problem solving using linear, exponential and other mathematical models. Students will develop conceptual and procedural tools that support the use of key mathematical concepts in a variety of contexts. This course is not designed for Science, Technology, Engineering, or Math (STEM) students and/or others who require calculus. This course may be used as the first of a two part sequence that ends with Quantitative Reasoning as the capstone general education math requirement.

Total Credits 3.00

Course Competencies

1. Demonstrate operation sense by communicating verbally and symbolically the effects of common operations on numbers.

Assessment Strategies

- 1.1. by completing assignments, quizzes, lab work, and tests with a satisfactory score as detailed in the grading scale
- 1.2. by active participation in class discussion and activities

Criteria

- 1.1. you use correct operation sense in algebraic expressions
- 1.2. you communicate verbally and symbolically the correct effects of common operations on numbers
- 1.3. you represent very large and very small numbers from real-world problems using scientific notation
- 1.4. you explain the importance and value of using scientific notation
- 1.5. you demonstrate how and when to estimate results, solve problems, detect errors, and check accuracy.
- 1.6. you apply quantitative reasoning to solve problems involving quantities or rates.
- 1.7. you convert between different measurement units and use measurement terms correctly
- 1.8. you compute different types of mathematical data summaries such as: measures of central tendency and mathematical models.
- 1.9. you use measures of central tendency and mathematical models to represent data.
- 1.10. you read, interpret, and make decisions based upon data from graphical displays such as line graphs, bar graphs, scatterplots, and histograms.

2. Apply quantitative reasoning strategies to solve real-world problems involving ratios, rates, proportions, and scaling

Assessment Strategies

- 2.1. by completing assignments, quizzes, lab work, and tests with a satisfactory score as detailed in the grading scale
- 2.2. by active participation in class discussion and activities

Criteria

- 2.1. you identify proportional relationships from verbal and numeric representations
- 2.2. you compare proportional relationships represented in different ways
- 2.3. you apply quantitative reasoning strategies to solve real-world problems with proportional relationships
- 2.4. you appropriately use whole numbers, fractions, decimals, and units to describe and fully explain proportional relationships

3. Describe the underlying structure of quantitative reasoning problems using the language and structure of algebra**Assessment Strategies**

- 3.1. by completing assignments, quizzes, lab work, and tests with a satisfactory score as detailed in the grading scale
- 3.2. by active participation in class discussion and activities

Criteria

- 3.1. you explain the various uses of variables to represent quantities or attributes
- 3.2. you describe the effect that a change in the value of one variable has on the value(s) of the other variables in an algebraic relationship
- 3.3. you construct and use equations or inequalities to accurately represent relationships involving one or more unknown or variable quantities to solve problems.

4. Translate quantitative reasoning problems from a variety of contexts into mathematical models**Assessment Strategies**

- 4.1. by completing assignments, quizzes, lab work, and tests with a satisfactory score as detailed in the grading scale
- 4.2. by active participation in class discussion and activities

Criteria

- 4.1. you translate problems from a variety of contexts into linear, exponential, or quadratic mathematical representations and vice versa
- 4.2. you describe the behavior of common types of functions using words, algebraic symbols, graphs, and tables
- 4.3. you identify when a linear model or trend is reasonable for given data. When a linear model does not appear to be reasonable, you explore the applicability of other models.
- 4.4. you identify important characteristics of functions in various representations.
- 4.5. you use appropriate terms and units to describe rate of change
- 4.6. you explain why mathematical models used to characterize real-world scenarios or physical relationships may be inexact or subject to error from many sources, including variability