Instructor's Name:

Office Location:

Office Hours:

Office Phone:

E-mail:

Course Description

Emphasis is placed on structure, meaning, relationships, and types of thinking in elementary mathematics. Problem solving, sets, numeration systems, integers, logic, rational numbers, and ratio and proportion are among the topics considered.

Illinois Articulation Initiative (IAI) number: N/A

Credit and Contact Hours:

Lecture	**4**
Lab	**0**
Credit Hours	**4**

Prerequisites: Satisfactory placement test score or "C" or better in MATH 095 and MATH 098 or equivalents; enrollment in pre-elementary education curriculum or written consent from the Mathematics department.

Books, Supplies, and Supplementary Materials

A.   **Textbooks**

Required: Mathematical Reasoning for Elementary Teachers w/*MyMathLab* set, 7th Edition, 2014; Long
Publisher: Pearson Education
ISBN: 9780133955064

B.   **Other Required Materials**

Other Course Requirements

Pass a Departmental Basic Skills Test. The student will not be able to use a calculator and must get 70% or higher to pass.

Methods of Instruction: Lecture, Online

Student Learning Outcomes: General Education Student Learning Outcomes:
Students will demonstrate the ability to accurately apply correct mathematical methods and techniques in various applications such as applied sciences, theoretical mathematics, physics, natural sciences and other applied sciences.

Objectives

1. Problem Solving
    - Use pattern finding techniques to determine any term of a sequence.
    - Use pattern finding techniques or formulas to find the general term of a sequence.
    - Classify sequences as arithmetic, geometric, or neither.
    - Use a variety of problem-solving strategies in solving problems.
    - Describe the steps of the problem-solving process.

2. Sets
    - Shade a Venn diagram to illustrate set unions and intersections and complements.
    - Distinguish between finite sets and infinite sets.
    - Recognize and diagram set relations.
    - Define a set and the elements or members of a set.
    - Define a well-defined set, and be able to distinguish between sets that are well defined and those that are not well defined.
    - Define and give examples of equal or identical sets.
    - Define the universal set.
    - Determine the Cartesian product of two sets.
    - Distinguish between subsets and proper subsets.
    - Define the null set, or the empty set.
    - Determine the subsets and proper subsets given any universal set.
    - Define the complement of a set, and be able to correctly find the complement of any set given any universal set.
    - Define equivalent sets, and be able to recognize them.
    - Define the cardinal number of a set, and be able to recognize them.
    - Define the intersection of two sets, and be able to determine the intersection given any two sets.
    - Define disjoint sets, and be able to recognize them.
    - Define the union of two sets, and be able to determine the union given any two sets.
    - Correctly use Venn diagrams to find the solutions to work problems.
    - Define the set difference and be able to correctly find the set difference of any given sets.

3. Functions
    - Define a relation and a function.
    - Evaluate functions using function notation.
    - Write rules or phrases that could describe a relation or function.
    - Determine domains and ranges of functions.
    - Define the composition of two functions and be able to determine the composition.
    - Graph a linear function.

4. Logic
    - Classify conjunctions, disjunctions, conditionals and biconditionals as true or false
    - Write the converse, inverse, and contrapositive of a conditional statement.
    - Determine whether a valid conclusion can be made on the basis of a conditional and a simple statement.
    - Draw Euler circles to determine if an argument is valid or invalid.
    - Define quantifiers and their negations.

5. Numeration Systems
   Identify the characteristics of the Hindu-Arabic numeration system.
   Convert numerals from the Hindu-Arabic numeration system other numeration systems (Egyptian, Babylonian, Mayan, or Roman) and vice versa.
   Write a numeral using different forms of expanded notation.
   Convert numbers from decimal notation to non-decimal notation and vice versa.
   Perform addition, subtraction, multiplication and division in non-decimal bases.
   Take any numeral expressed in any other base and convert it to an equivalent numeral in base ten (base 2, 5, or 12).
   Convert any numeral expressed in base ten to an equivalent numeral in any other base (base 2, 5, or 12).

6. Whole Number Operations
   Illustrate addition and subtraction situations using set models and number line models.
   Recognize statements of the properties of the whole numbers under addition.
   Illustrate multiplication and division situations using set and array models.
   Recognize statements of the properties of the whole numbers under multiplication.
   Relate operations with multiples of 10 to "basic fact" results.
   Demonstrate an understanding of the algorithms by using some form of expanded notation or modeling.
   Simplify multiplication expressions involving exponents.
   Use and describe mental math techniques.
   Estimate results by using rounding front-end digit strategy and grouping to nice numbers strategy.
   Use the scratch addition algorithm.
   Use the lattice multiplication algorithm.

7. Integers
   Form the set integers, and be able to distinguish between positive integers, negative integers, and 0.
   Use a set model and number line to illustrate operations with integers when appropriate.
   Perform calculations with integers.
   Use the chip model for addition, subtraction, and multiplication of integers.
   Use the order of operations to simplify expressions.
   Factor integer expressions.
   Recognize statements of the properties of integers under addition and multiplication.

8. Number Theory
   Distinguish between numbers that are prime numbers and those that are composite numbers.
   Find the greatest common divisor of any two or three numbers.
   Find the least common multiple of any two or three numbers.
   Determine whether a given number is divisible by 2, 3, 4, 5, 6, 7, 8, 9, 10 or 11.
   Write the prime factorization of a number.
   List the factors of a number.
   Define and use the Euclidian algorithm.
   Define and use factor, divisor, and multiple with the "divides" symbol.

9. Clock Arithmetic
   Perform the operations of addition, subtraction, multiplication, and division in clock arithmetic and in any given module system.
   Define modular congruence and use the definition to determine if statements are true or false.

10. Rational Numbers
    Find fractions that are equivalent to a given fraction
    Change a given fraction to an equivalent fraction in lowest terms
    Add and subtract fractions with like denominators and unlike denominators
    Multiply fractions and mixed numbers
    Divide fractions and mixed numbers
    Determine whether any two given rational numbers are equivalent
    Order fractions
    Illustrate and use the denseness property

11. Ratio & Proportion
    Write ratios to represent real-life situations.
    Solve problems involving proportions.

12. Integer Exponents
    Apply the properties of exponents to rational numbers.

13. Decimals
    Distinguish between rational and irrational numbers.
    Determine if a rational number is terminating or repeating.
    Convert from decimal notation to scientific notation.
    Convert from scientific notation to decimal notation.
    Order repeating decimals.
    Round decimals.
    Convert a repeating decimal to a fraction.

14. Real Numbers, Radicals and Exponents
    Form the set of real numbers and distinguish between rational numbers and irrational
        numbers.
    Define the principal square root and the nth root.
    Change expressions from radical form to rational exponent form.
    Change expressions from rational exponent form to radical form.
    Solve problems with rational exponents and/or radicals.

15. Percents
    Define percent.
    Change from percent notation to fraction or decimal notation.
    Change from fraction of decimal notation to percent notation.
    Solve percent application including simple and compound interest.

16. Translate English sentences to algebraic expressions.

17. Solve algebraic equations and applications.

Graded Assignments and Policies

Graded Assignments

In class Quizzes	0 – 20%
Participation	0 - 5 %
Projects	0 – 20%
Homework	0 – 30%
Tests	50 - 85%
Final	15 – 30%

Grading Policy
The individual instructor will determine which items he or she considers essential for the student to memorize without error and test accordingly.

Each instructor will set minimum standards for performance on tests.
Grading Scale

90-100% A
80-89% B
70-79% C
60-69% D
0-59% F

Major Tests and Quizzes
The individual instructor will determine which items he or she considers essential for the student to memorize without error and test accordingly. Each instructor will set minimum standards for performance on tests. A comprehensive final examination will be given.

Classroom Policies and Procedures

General Information

Attendance Policy

Make-up Policy

Extra-credit Policy

Final Exam Information
A comprehensive final examination will be given.

Academic Honor Code
The objective of the academic honor code is to sustain a learning-centered environment in which all students are expected to demonstrate integrity, honor, and responsibility, and recognize the importance of being accountable for one's academic behavior.

College Statement about grades of "F" and Withdrawal from Class
Students may withdraw from a course by processing an add/drop form during regular office hours through the Registration and Records Office at Main Campus or Romeoville Campus, or by phone at 815-744-2200. Please note the withdrawal dates listed on your bill or student schedule. Every course has its own withdrawal date. Failure to withdraw properly may result in a failing grade of "F" in the course.

At any time prior to the deadline dates established, an instructor may withdraw a student from class because of poor attendance, poor academic performance or inappropriate academic behavior, such as, but not limited to, cheating or plagiarism.

Intellectual Property
Students own and hold the copyright to the original work they produce in class. It is a widely accepted practice to use student work as part of the college's internal self-evaluation, assessment procedures, or other efforts to improve teaching and learning and in promoting programs and recruiting new students. If you do not wish your work to be used in this manner, please inform the instructor.

Student Code of Conduct
Each student is responsible for reading and adhering to the Student Code of Conduct as stated in the college catalog.

Sexual Harassment
Joliet Junior College seeks to foster a community environment in which all members respect and trust each other. In a community in which persons respect and trust each other, there is no place for sexual harassment. JJC has a strong policy prohibiting the sexual harassment of one member of the college community by another. See the Catalog or Student Handbook.

Student Support http://jjc.edu/services-for-students/pages/default.aspx

a. Disability Services: http://www.jjc.edu/disability-services/Pages/default.aspx.
    Student Accommodations and Resources (StAR): If you need disability-related accommodations, specialized tutoring, or assistive technology in this class, if you have emergency medical information you wish to share with me, or if you need special arrangements in case the building must be evacuated, please inform me immediately. Please see me privately after class. New students should request accommodations and support by scheduling an appointment with the Student Accommodations and Resources (StAR) Office, Campus Center 1125, (815) 280-2230.

b. Tutoring: http://jjc.edu/tlc/Pages/default.aspx

c. Counseling and Advising: http://www.jjc.edu/counselingadvising/Pages/default.aspx

d. Academic Resources: http://www.jjc.edu/academic-resources/Pages/default.aspx

e. Support Programs and Services:
     http://www.jjc.edu/support-programs-services/Pages/default.aspx

f. Technology Support: http://jjc.edu/services-for-students/Pages/technology-support.aspx

g. My Degree Progress: My Degree Progress is a computerized system to track a student's progress toward graduation. The report indicates every course and places these courses into their appropriate category as a General Education, Major Course, or Elective, according to the degree requirements. This tool is useful for preparing before an advising appointment, for planning, for registering, and for checking that the student is on track for graduation. https://eresources.jjc.edu

Prepared by: Reviewed by:

Prof. Angela McNulty   Prof. Jean McArthur
Mathematics Department   Department Chair   Date

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