SECTION I

SUBJECT AREA AND COURSE NUMBER

HSDP 502

COURSE TITLE

MATH B-SEMESTER 1

TYPE COURSE

NON-FEE   HSDP

CATALOG COURSE DESCRIPTION

This is the first semester of a two semester course covering fundamental mathematical concepts and serving as a bridge between basic calculation skills and the study of algebra and geometry. It is tailored to a concrete learning style and provides opportunities for exploration, investigation, and reasoning while encouraging cooperative learning. The course integrates the themes of numbers and patterns, geometry and measure, statistics, graphical investigations, and algebra. (FT)

LECTURE HOURS   LABORATORY HOURS

        90

ADVISORY

NONE

RECOMMENDED SKILL LEVEL

Ability to perform arithmetic operations with whole numbers, fractions and decimals.

INSTITUTIONAL STUDENT LEARNING OUTCOMES

1. Social Responsibility
    SDCE students demonstrate interpersonal skills by learning and working cooperatively in a diverse environment.
2. Effective Communication
    SDCE students demonstrate effective communication skills.

INSTITUTIONAL STUDENT LEARNING OUTCOMES (CONTINUED)

3. Critical Thinking
   SDCE students critically process information, make decisions, and solve problems independently or cooperatively.
4. Personal and Professional Development
   SDCE students pursue short term and life-long learning goals, mastering necessary skills and using resource management and self advocacy skills to cope with changing situations in their lives.

COURSE GOALS

Acquire the ability to identify, compare, and order whole numbers, integers, and rational numbers in both fraction and decimal form. Perform arithmetic operations with whole numbers, decimals and integers. Use the number line to compare, order, and graph numbers. Write numbers in scientific notation. Use prime factorization to find greatest common factors and least common multiples.

Be able to identify and extend patterns in mathematical sequences. Be able to recognize a mathematical function, describe a function rule, make a function table, and graph basic functions on a coordinate plane. Work with statistical data using line, bar, and pictographs. Organize data in frequency tables. Determine mean, median, mode, and range of sets of data.

Be able to solve linear equations with one variable, translate English language phrases and sentences to mathematical expressions and statements, and use algebraic equations to solve problems.

Develop a vocabulary of basic geometric terms. Measure and classify angles. Identify perpendicular and parallel lines. Learn relationships of angles formed by intersecting parallel lines and transversals. Identify and measure the angles of various polygons. Learn classification and properties of various types of triangles and quadrilaterals.

Use tables, diagrams, graphs, pattern recognition, equations and other strategies to solve problems.

COURSE OBJECTIVES

Each student who successfully completes this course will be able to:

1. Evaluate variable expressions involving arithmetic operations of addition, subtraction, multiplication, and division using whole numbers, decimals, and fractions.
2. Compare and order numbers. Use inequality symbols.
3. Use commutative and associative properties of addition and multiplication to assist in performing calculations mentally.
4. Compute with exponents and evaluate expressions containing exponents.
5. Apply the order of operations in computations and evaluation of expressions.
6. Simplify exponential expressions containing products of exponentials with the same base.
7. Use the distributive property to simplify expressions and assist in mental calculations.
8. Simplify expressions by combining like terms.

COURSE OBJECTIVES (CONTINUED)

9.   Recognize and extend patterns.
10. Complete function tables. Find function rules using tables.
11. Recognize and use metric units of measure.
12. Write numbers in scientific notation.
13. Recognize and compare integers and find opposites and absolute values.
14. Add, subtract, multiply, and divide integers.
15. Evaluate expressions involving integers.
16. Find coordinates and graph coordinates on a coordinate plane.
17. Graph functions on a coordinate plane.
18. Solve equations by substitution and mental math.
19. Solve equations using addition or subtraction.
20. Solve equations using multiplication or division.
21. Solve equations using multiple inverse operations.
22. Convert English language words and phrases to mathematical expressions.
23. Convert English language sentences to mathematical statements.
24. Solve equations involving combining like terms and application of the distributive property.
25. Work with formulas.
26. Interpret and draw pictographs.
27. Interpret single and double bar graphs.
28. Interpret single and double line graphs.
29. Draw bar and line graphs for a given set of data.
30. Decide whether a bar graph or a line graph is more appropriate for displaying a given set of data.
31. Find the mean, median, mode and range of a set of data.
32. Decide whether a given measure of central tendency is appropriate for a given set of data.
33. Analyze profits and losses using a double line graph.
34. Identify basic geometric figures.
35. Measure and draw angles using a protractor.
36. Find measures of acute, right, obtuse, straight, complementary, vertical, and adjacent angles.
37. Identify/construct perpendicular and parallel lines.
38. Determine the measures of various angles formed when a transversal intersects parallel lines.
39. Identify types of polygons and find the measure of their angles.
40. Classify triangles by their sides and angles.
41. Identify special quadrilaterals and apply their properties.
42. Recognize and find lines of symmetry in plane figures.
43. Find the prime factorization of a number.
44. Find greatest common factors and least common multiples.
45. Find equivalent fractions and reduce fractions to lowest terms.
46. Simplify algebraic fractions.
47. Compare fractions.
48. Write fractions as decimals and decimals as fractions.
49. Recognize rational numbers.
50. Graph solutions to equations and inequalities on a number line.
51. Simplify expressions involving negative and zero exponents.
52. Use negative exponents to write numbers in scientific notation.

COURSE OBJECTIVES (CONTINUED)

53. Read problems to identify which facts are given, what information is to be found, and whether any given information is not needed.
54. Use a four step plan to solve problems.
55. Check answers to problems.
56. Decide whether an estimate or an exact answer is needed for the solution to a problem.
57. Make and use tables as a problem solving strategy.
58. Solve problems by guessing and checking.
59. Solve problems by using equations.
60. Solve problems involving too much or not enough information.
61. Solve problems by identifying a pattern.
62. Solve problems by drawing a diagram.

SECTION II

COURSE CONTENT AND SCOPE

1. Connecting Arithmetic and Algebra (12 hours)
    1.1. Variables and variable expressions
    1.2. Addition and subtraction expressions
    1.3. Multiplication and division expressions
    1.4. Reading for understanding
    1.5. The comparison property
    1.6. Properties of addition
    1.7. Properties of multiplication
    1.8. Choosing the most efficient method of computation
    1.9. Exponents
    1.10. Order of operations
2. Introduction to Algebra (15 hours)
    2.1. Simplifying multiplication expressions
    2.2. The distributive property
    2.3. Combining like terms
    2.4. Using a four step plan
    2.5. Patterns
    2.6. Functions
    2.7. Checking the answer
    2.8. Finding an estimate or an exact answer
    2.9. The metric system of measurements
    2.10. Scientific notation
3. Integers (12 hours)
    3.1. Integers on a number line
    3.2. Adding integers with the same sign
    3.3. Adding integers with different signs
    3.4. Subtracting integers
    3.5. Multiplying and dividing integers
    3.6. Evaluating expressions involving integers
    3.7. Strategy: making a table

COURSE CONTENT AND SCOPE (CONTINUED)

    3.8.   The coordinate plane
    3.9.   Graphing functions
4.   Equations   (12 hours)
    4.1.   Equations
    4.2.   Strategy: guess and check
    4.3.   Using addition or subtraction
    4.4.   Using multiplication or division
    4.5.   Two step equations
    4.6.   Writing variable expressions
    4.7.   Writing equations
    4.8.   Strategy: using equations
    4.9.   More equations
    4.10. Formulas
5.   Graphs and Data Analysis   (12 hours)
    5.1.   Pictographs
    5.2.   Interpreting bar graphs
    5.3.   Interpreting line graphs
    5.4.   Drawing bar and line graphs
    5.5.   Choosing the appropriate type of graph
    5.6.   Too much or not enough information
    5.7.   Misleading graphs
    5.8.   Mean, median, mode and range
    5.9.   Choosing the appropriate statistic
    5.10. Data collection and frequency tables
6.   Introduction to Geometry   (12 hours)
    6.1.   Points lines and planes
    6.2.   Measuring and drawing angles
    6.3.   Types of angles
    6.4.   Perpendicular and parallel lines
    6.5.   Polygons
    6.6.   Triangles
    6.7.   Quadrilaterals
    6.8.   Strategy: identifying a pattern
    6.9.   Symmetry
7.   Number Theory and Fraction Concepts   (15 hours)
    7.1.   Factors and prime numbers
    7.2.   Greatest common factor
    7.3.   Least common multiple
    7.4.   Equivalent fractions
    7.5.   Simplifying algebraic fractions
    7.6.   Comparing fractions
    7.7.   Fractions and decimals
    7.8.   Strategy: drawing a diagram
    7.9.   Rational numbers
    7.10. Graphing open sentences
    7.11. Negative and zero exponents

APPROPRIATE READINGS

NONE

WRITING ASSIGNMENTS

NONE

OUTSIDE ASSIGNMENTS

Students are expected to spend approximately 30 minutes in outside study for each class lesson. Assignments may include, but not necessarily be limited to:

1. Completion of problem sets.
2. Studying textbook material.
3. Studying for unit examinations.

APPROPRIATE ASSIGNMENTS THAT DEMONSTRATE CRITICAL THINKING

Students will be required to select and apply appropriate problem solving strategies to solve verbal problems.

EVALUATION

Student performance assessment will be based upon, but not necessarily limited to, periodic quizzes, chapter examinations, completion of written assignments, and attendance and participation in class.
An overall grade will be assigned at the end of the course. A minimum passing grade (letter grade D) will be required for enrollment in the second semester of Math-B.

METHOD OF INSTRUCTION

Lectures, instructor guided discussions, individual tutoring, and cooperative learning in peer groups will assist the students in successfully completing their work. In addition, when considered appropriate by the instructor, individual work packets may be provided to the students to facilitate small group and individual, self-paced work. Manipulatives such as algebra tiles and integer chips will be use to model mathematical concepts. Field trips may be utilized.

TEXTS AND SUPPLIES

Texts:

Mathematical Connections, Gardella, Fraze, Meldon, and Weingarden; Houghton-Mifflin 1992
Teacher's Guide and Student Work Packets (Published by San Diego City Schools)

<u>TEXTS AND SUPPLIES</u> (CONTINUED)

Supplies:

Suggested materials to be used in demonstrating mathematical concepts include fraction bars, integer chips, algebra tiles, colored poster paper and scissors.

Recommended student supplies include a scientific calculator, and a compass, a straightedge, and a protractor.

PREPARED BY: <u>Jerry Sullivan</u>   DATE: <u>August 26, 1995</u>

DATA REVISED BY <u>Instructional Services/SLO's Added</u>   DATE <u>January 24, 2014</u>

Instructors must meet all requirements stated in Policy 3100 (Student Rights, Responsibilities and Administrative Due Process), and the Attendance Policy set forth in the Continuing Education Catalog.

<u>REFERENCES</u>:

San Diego Community College District Policy 3100
California Community Colleges, Title 5, Section 55002
Continuing Education Catalog