MATH 011: MATH CONCEPTS FOR ELEMENTARY SCHOOL TEACHERS - NUMBER SYSTEMS

Date Submitted: Tue, 09 Jun 2020 02:12:39 GMT

Originator

mflora

Justification / Rationale

Periodic update. Include new prerequisite course (Math 45)
Add AB 705 Statement.

Effective Term

Fall 2020

Credit Status

Credit - Degree Applicable

Subject

MATH - Mathematics

Course Number

011

Full Course Title

Math Concepts for Elementary School Teachers - Number Systems

Short Title

MATH ELEM TEACHERS

Discipline

Disciplines List
Mathematics

Modality

Face-to-Face

Catalog Description

This course covers mathematical topics needed for elementary school teaching with a focus on quantitative reasoning, problem solving and communication. Topics include structure of the real number system, sets, numeration systems, computation algorithms, problem solving strategies, and elementary number theory. The course meets requirements for elementary school teacher certification. (C-ID MATH 120)
Note: All students now can enroll in this transfer-level course without completing posted requisites. Please refer to AB 705 (under How do I enroll in courses at COD?) or see a Counselor.

Schedule Description

This course focuses on the development of quantitative reasoning skills through in depth, integrated explorations of topics in mathematics, including real numbers systems and subsystems. Emphasis is on comprehension and analysis of mathematical concepts and applications of logical reasoning.
Prerequisite: MATH 45 or MATH 040 or completion of two years of High School Algebra
Advisory: MATH 030 or one year High School Geometry, ENG 061, & RDG 061

Lecture Units

3

Lecture Semester Hours

54

Lab Units

1

Lab Semester Hours
54

In-class Hours
108

Out-of-class Hours
108

Total Course Units
4

Total Semester Hours
216

Prerequisite Course(s)
MATH 45 or MATH 040 or completion of two years of High School Algebra
Advisory: MATH 030 or one year High School Geometry, ENG 061, & RDG 061

Required Text and Other Instructional Materials

Resource Type
Book

Author
Musser, G., Burger, W., and Peterson, B.

Title
Mathematics for Elementary Teachers: A Contemporary Approach

Edition
10

City
New York

Publisher
John Wiley and Sons

Year
2013

College Level
Yes

Flesch-Kincaid Level
12

ISBN #
9781118457443

Resource Type
Book

Author
Sowder, L., Sowder, J., Nickerson, S.

Title
Reconceptualizing Mathematics for Elementary School Teachers

Edition
3rd

Publisher
Freeman

Year
2017

College Level
Yes

ISBN #
9781464193330

Resource Type
Web/Other

Open Educational Resource
Yes

Year
Miscellaneous

Description
Common Core Standards:
https://www.nctm.org/ccssm/
and
https://www.cde.ca.gov/be/st/ss/documents/ccssmathstandardaug2013.pdf
and
https://www.cde.ca.gov/be/st/ss/vaprekindergarten.asp

Class Size Maximum
30

Entrance Skills
Recognize that the key characteristic of a linear model is its constant rate of change. Recognize and create linear models in the form of tables, graphs, equations, and functions.

Requisite Course Objectives
MATH 040-Find the equation of a line and apply it to solve problems with a constant of change.
MATH 040-Create a linear model in the form of a table, graph, or equation.
MATH 040-Recognize when a table, graph, or equation is linear.
MATH 040-Interpret slope as a rate of change.
MATH 040-Comprehend that the key characteristic of a linear model is its constant rate of change.
MATH 040-Comprehend that the key characteristic of a linear model is its constant rate of change.
MATH 040-Interpret slope as a rate of change.
MATH 040-Recognize when a table, graph, or equation is linear.
MATH 040-Create a linear model in the form of a table, graph, or equation.
MATH 040-Find the equation of a line and apply it to solve problems with a constant of change.
MATH 040-Apply the definition of a function including function notation and terminology (domain and range).
MATH 045-Comprehend that the key characteristic of a linear model is its constant rate of change and interpret slope as a rate of change and relate slope to topics from social sciences.
MATH 045-Recognize when a table, graph, or equation is linear and recognize when a scatterplot appears to show linear correlation and be able to describe this relationship and discuss how it does not necessarily reflect causation in written form.
MATH 045-Create a linear model in the form of a table, graph, or equation, including a line of best fit for a set of given points.
MATH 045-Find the equation of a line and apply it to solve financial and social sciences problems involving constant rates of change.
MATH 045-Understand the definition of a function including the use of function notation, arrow diagrams, graphs, and terminology such as domain, range, independent variables, and dependent variables.

Entrance Skills

Understand and use the language of algebra (such as variable, slope, and coefficient) and arithmetic (such as prime, factor, and multiple).

Requisite Course Objectives

ENG 061-Demonstrate the ability to think critically and express ideas using various patterns of development.
ENG 061-Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text.
MATH 030-Communicate effectively with the instructor and mathematical community using proper terminology and correct notation.
MATH 040-Apply the definition of a function including function notation and terminology (domain and range).
MATH 040-Apply the definition of a function including function notation and terminology (domain and range).
MATH 045-Comprehend that the key characteristic of a linear model is its constant rate of change and interpret slope as a rate of change and relate slope to topics from social sciences.
MATH 045-Recognize when a table, graph, or equation is linear and recognize when a scatterplot appears to show linear correlation and be able to describe this relationship and discuss how it does not necessarily reflect causation in written form.
MATH 045-Understand the definition of a function including the use of function notation, arrow diagrams, graphs, and terminology such as domain, range, independent variables, and dependent variables.
MATH 045-Apply functions to topics from social sciences and consumer mathematics, including ceiling and floor functions.
MATH 045-Evaluate multivariate formulas useful in statistics and financial mathematics such as Max, Min, Arithmetic Mean, Median, Combinations, Permutations, and simple and compound interest formulas; know the mathematical and statistical symbols used in them; and become familiar with when each formula is applicable.
MATH 045-Understand the definitions one-to-one and inverse functions, including log functions, and observe them in applications from statistics and financial mathematics.
RDG 061-Understand multiple word meanings, uses synonyms

Entrance Skills

Apply the operations on integers, non-integers represented as fractions, and non-integers represented as decimals. Understand and use the commutative, associative, distributive, identity, inverse, and zero properties of real numbers.

Requisite Course Objectives

MATH 030-Communicate effectively with the instructor and mathematical community using proper terminology and correct notation.
MATH 030-Independently analyze and set up application problems, thus applying problem solving techniques to new situations. Also, anticipate and check proposed solutions.
MATH 045-Evaluate multivariate formulas useful in statistics and financial mathematics such as Max, Min, Arithmetic Mean, Median, Combinations, Permutations, and simple and compound interest formulas; know the mathematical and statistical symbols used in them; and become familiar with when each formula is applicable.
MATH 045-Evaluate root functions, including multivariate functions such as the standard deviation.
MATH 045-Investigate and practice general problem solving strategies, including Polya's problem solving techniques, pattern analysis, inductive and deductive reasoning examples, and estimation techniques for predicting feasible answers and discovering errors.
MATH 045-Evaluate expressions using summation notation, including those requiring the use of the order of operations involving sums of many values.

Entrance Skills

Interpret and create graphs in one- and two-dimensions that represent solution sets of equations and inequalities.

Requisite Course Objectives

MATH 040-Recognize when a table, graph, or equation is exponential and when a word problem can be modeled with an exponential function.
MATH 040-Solve root equations.
MATH 040-Graph and find the equation of a circle.
MATH 040-Graph systems of linear inequalities in two dimensions.
MATH 040-Find the equation of a line and apply it to solve problems with a constant of change.
MATH 040-Create a linear model in the form of a table, graph, or equation.
MATH 040-Recognize when a table, graph, or equation is linear.
MATH 040-Recognize when a table, graph, or equation is linear.
MATH 040-Create a linear model in the form of a table, graph, or equation.
MATH 040-Find the equation of a line and apply it to solve problems with a constant of change.
MATH 040-Solve 2x2 and 3x3 systems of linear equations.
MATH 040-Graph systems of linear inequalities in two dimensions.
MATH 040-Graph and find the equation of a circle.
MATH 040-Recognize when a table, graph, or equation is quadratic.
MATH 040-Graph a parabola by finding the vertex, intercepts, and other symmetric points.
MATH 040-Solve root equations.

MATH 040-Recognize when a table, graph, or equation is exponential and when a word problem can be modeled with an exponential function.
MATH 045-Recognize when a table, graph, or equation is linear and recognize when a scatterplot appears to show linear correlation and be able to describe this relationship and discuss how it does not necessarily reflect causation in written form.
MATH 045-Create a linear model in the form of a table, graph, or equation, including a line of best fit for a set of given points.
MATH 045-Find the equation of a line and apply it to solve financial and social sciences problems involving constant rates of change.
MATH 045-Solve 2x2 and 3x3 systems of linear equations and solve application problems from social sciences.
MATH 045-Graph systems of linear inequalities in two dimensions and find the coordinates of points of intersection, including application problems similar to examples from linear programming.
MATH 045-Understand the definition of a function including the use of function notation, arrow diagrams, graphs, and terminology such as domain, range, independent variables, and dependent variables.
MATH 045-Recognize when a table, graph, or equation is exponential and when a word problem can be modeled with an exponential function, including equations and graphs of functions similar to continuous probability distributions.

Entrance Skills

Understand and use basic geometric terminology (e.g. right triangle, square, rectangle, perimeter, area, volume, and angle).

Requisite Course Objectives

ENG 061-Demonstrate the ability to think critically and express ideas using various patterns of development.
ENG 061-Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text.
MATH 030-Apply the principles of deductive reasoning in geometry and its applications.
MATH 030-Develop the practice of defining terms, thinking accurately, establishing conclusions through deductive reasoning, realizing:i.the importance of precise definitions in every body of knowledge;ii.how axioms and postulates of mathematics are necessary assumptions given without proof;iii.how propositions build on postulates and how basic propositions are used to prove more advanced propositions.
MATH 030-Communicate effectively with the instructor and mathematical community using proper terminology and correct notation.
MATH 045-Investigate and practice general problem solving strategies, including Polya's problem solving techniques, pattern analysis, inductive and deductive reasoning examples, and estimation techniques for predicting feasible answers and discovering errors.
MATH 045-Create, manipulate, and analyze tables and charts including an introduction to writing basic formulas in spreadsheets, describing shapes of frequency distributions, reading histograms, and the advantages disadvantages of a variety of diagrams such as Venn and Euler diagrams, pie/circle graphs, scatterplots, bar graphs, and time series.
RDG 061-Understand multiple word meanings, uses synonyms

Entrance Skills

Solve application problems and simple number puzzles using arithmetic and algebraic models.

Requisite Course Objectives

ENG 061-Demonstrate the ability to think critically and express ideas using various patterns of development.
ENG 061-Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text.
MATH 030-Develop the practice of defining terms, thinking accurately, establishing conclusions through deductive reasoning, realizing:i.the importance of precise definitions in every body of knowledge;ii.how axioms and postulates of mathematics are necessary assumptions given without proof;iii.how propositions build on postulates and how basic propositions are used to prove more advanced propositions.
MATH 030-Independently analyze and set up application problems, thus applying problem solving techniques to new situations. Also, anticipate and check proposed solutions.
MATH 045-Investigate and practice general problem solving strategies, including Polya's problem solving techniques, pattern analysis, inductive and deductive reasoning examples, and estimation techniques for predicting feasible answers and discovering errors.
RDG 061-Read a variety of texts fluently.

Entrance Skills

Graph a circle by using the center point and radius. Find an equation of a circle by either using center point and radius or by completing the square.

Requisite Course Objectives

MATH 040-Graph and find the equation of a circle.
MATH 040-Graph and find the equation of a circle.
MATH 040-Solve quadratic equations by factoring, completing the square, taking square roots or the quadratic formula.

Entrance Skills

Recognize that a relation is a collection of ordered pairs and that a function is a relation that is a rule of assignment between independent and dependent variable. Recognize and use function notation.

Requisite Course Objectives

MATH 040-Apply the definition of a function including function notation and terminology (domain and range).
MATH 040-Apply the definition of a function including function notation and terminology (domain and range).
MATH 045-Understand the definition of a function including the use of function notation, arrow diagrams, graphs, and terminology such as domain, range, independent variables, and dependent variables.
MATH 045-Apply functions to topics from social sciences and consumer mathematics, including ceiling and floor functions.
MATH 045-Evaluate root functions, including multivariate functions such as the standard deviation.
MATH 045-Understand the definitions one-to-one and inverse functions, including log functions, and observe them in applications from statistics and financial mathematics.
RDG 061-Understand multiple word meanings, uses synonyms

Entrance Skills

Evaluate linear and non-linear functions. Create functions to model linear relationships.

Requisite Course Objectives

MATH 040-Recognize when a table, graph, or equation is exponential and when a word problem can be modeled with an exponential function.
MATH 040-Apply the definition of a function including function notation and terminology (domain and range).
MATH 040-Recognize when a table, graph, or equation is linear.
MATH 040-Create a linear model in the form of a table, graph, or equation.
MATH 040-Find the equation of a line and apply it to solve problems with a constant of change.
MATH 040-Recognize when a table, graph, or equation is linear.
MATH 040-Create a linear model in the form of a table, graph, or equation.
MATH 040-Find the equation of a line and apply it to solve problems with a constant of change.
MATH 040-Recognize when a table, graph, or equation is quadratic.
MATH 040-Create a quadratic model with a table, graph, or equation and solve maximum and minimum problems.
MATH 040-Apply the definition of a function including function notation and terminology (domain and range).
MATH 040-Recognize when a table, graph, or equation is exponential and when a word problem can be modeled with an exponential function.
MATH 045-Comprehend that the key characteristic of a linear model is its constant rate of change and interpret slope as a rate of change and relate slope to topics from social sciences.
MATH 045-Recognize when a table, graph, or equation is linear and recognize when a scatterplot appears to show linear correlation and be able to describe this relationship and discuss how it does not necessarily reflect causation in written form.
MATH 045-Create a linear model in the form of a table, graph, or equation, including a line of best fit for a set of given points.
MATH 045-Find the equation of a line and apply it to solve financial and social sciences problems involving constant rates of change.
MATH 045-Understand the definition of a function including the use of function notation, arrow diagrams, graphs, and terminology such as domain, range, independent variables, and dependent variables.
MATH 045-Apply functions to topics from social sciences and consumer mathematics, including ceiling and floor functions.
MATH 045-Evaluate root functions, including multivariate functions such as the standard deviation.
MATH 045-Recognize when a table, graph, or equation is exponential and when a word problem can be modeled with an exponential function, including equations and graphs of functions similar to continuous probability distributions.
MATH 045-Understand the definitions one-to-one and inverse functions, including log functions, and observe them in applications from statistics and financial mathematics.

Entrance Skills

Use terminology concerning functions accurately. Construct the domain and range of a relation or function.

Requisite Course Objectives

ENG 061-Demonstrate the ability to think critically and express ideas using various patterns of development.
ENG 061-Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text.
MATH 030-Develop the practice of defining terms, thinking accurately, establishing conclusions through deductive reasoning, realizing:i.the importance of precise definitions in every body of knowledge;ii.how axioms and postulates of mathematics are necessary assumptions given without proof;iii.how propositions build on postulates and how basic propositions are used to prove more advanced propositions.
MATH 030-Communicate effectively with the instructor and mathematical community using proper terminology and correct notation.
MATH 040-Apply the definition of a function including function notation and terminology (domain and range).
MATH 040-Apply the definition of a function including function notation and terminology (domain and range).
MATH 045-Understand the definition of a function including the use of function notation, arrow diagrams, graphs, and terminology such as domain, range, independent variables, and dependent variables.

MATH 045-Apply functions to topics from social sciences and consumer mathematics, including ceiling and floor functions.
MATH 045-Understand the definitions one-to-one and inverse functions, including log functions, and observe them in applications from statistics and financial mathematics.
RDG 061-Understand multiple word meanings, uses synonyms

Entrance Skills

Read and comprehend language about mathematics.

Requisite Course Objectives

ENG 061-Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text.
MATH 030-Develop a knowledge and appreciation of the fundamental proposition symbols.
MATH 030-Develop the practice of defining terms, thinking accurately, establishing conclusions through deductive reasoning, realizing:i.the importance of precise definitions in every body of knowledge;ii.how axioms and postulates of mathematics are necessary assumptions given without proof;iii.how propositions build on postulates and how basic propositions are used to prove more advanced propositions.
MATH 030-Communicate effectively with the instructor and mathematical community using proper terminology and correct notation.
MATH 040-Apply the definition of a function including function notation and terminology (domain and range).
MATH 040-Apply the definition of a function including function notation and terminology (domain and range).
MATH 045-Recognize when a table, graph, or equation is linear and recognize when a scatterplot appears to show linear correlation and be able to describe this relationship and discuss how it does not necessarily reflect causation in written form.
MATH 045-Understand the definition of a function including the use of function notation, arrow diagrams, graphs, and terminology such as domain, range, independent variables, and dependent variables.
MATH 045-Evaluate multivariate formulas useful in statistics and financial mathematics such as Max, Min, Arithmetic Mean, Median, Combinations, Permutations, and simple and compound interest formulas; know the mathematical and statistical symbols used in them; and become familiar with when each formula is applicable.
MATH 045-Understand the definitions one-to-one and inverse functions, including log functions, and observe them in applications from statistics and financial mathematics.
RDG 061-Read a variety of texts fluently.
RDG 061-Understand multiple word meanings, uses synonyms

Entrance Skills

Communicate mathematical concepts from arithmetic and algebra orally and in writing.

Requisite Course Objectives

ENG 061-Use theses to organize paragraphs into coherent analyses.
ENG 061-Demonstrate the ability to think critically and express ideas using various patterns of development.
ENG 061-Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text.
MATH 030-Develop the practice of defining terms, thinking accurately, establishing conclusions through deductive reasoning, realizing:i.the importance of precise definitions in every body of knowledge;ii.how axioms and postulates of mathematics are necessary assumptions given without proof;iii.how propositions build on postulates and how basic propositions are used to prove more advanced propositions.
MATH 030-Communicate effectively with the instructor and mathematical community using proper terminology and correct notation.
MATH 040-Apply the definition of a function including function notation and terminology (domain and range).
MATH 045-Comprehend that the key characteristic of a linear model is its constant rate of change and interpret slope as a rate of change and relate slope to topics from social sciences.
MATH 045-Recognize when a table, graph, or equation is linear and recognize when a scatterplot appears to show linear correlation and be able to describe this relationship and discuss how it does not necessarily reflect causation in written form.
MATH 045-Understand the definition of a function including the use of function notation, arrow diagrams, graphs, and terminology such as domain, range, independent variables, and dependent variables.
MATH 045-Evaluate multivariate formulas useful in statistics and financial mathematics such as Max, Min, Arithmetic Mean, Median, Combinations, Permutations, and simple and compound interest formulas; know the mathematical and statistical symbols used in them; and become familiar with when each formula is applicable.
MATH 045-Understand the definitions one-to-one and inverse functions, including log functions, and observe them in applications from statistics and financial mathematics.
RDG 061-Read a variety of texts fluently.
RDG 061-Write organized summaries reactions that capture main idea and supporting details.
RDG 061-Understand multiple word meanings, uses synonyms

Entrance Skills

ADVISORY SKILLS:
Demonstrate critical thinking skills when reading, composing and participating in class discussions.

Requisite Course Objectives

ENG 061-Use theses to organize paragraphs into coherent analyses.
ENG 061-Demonstrate the ability to think critically and express ideas using various patterns of development.
ENG 061-Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text.
MATH 030-Develop the practice of defining terms, thinking accurately, establishing conclusions through deductive reasoning, realizing:i.the importance of precise definitions in every body of knowledge;ii.how axioms and postulates of mathematics are necessary assumptions given without proof;iii.how propositions build on postulates and how basic propositions are used to prove more advanced propositions.
MATH 030-Communicate effectively with the instructor and mathematical community using proper terminology and correct notation.
MATH 045-Recognize when a table, graph, or equation is linear and recognize when a scatterplot appears to show linear correlation and be able to describe this relationship and discuss how it does not necessarily reflect causation in written form.
MATH 045-Investigate and practice general problem solving strategies, including Polya's problem solving techniques, pattern analysis, inductive and deductive reasoning examples, and estimation techniques for predicting feasible answers and discovering errors.
RDG 061-Read a variety of texts fluently.
RDG 061-Write organized summaries reactions that capture main idea and supporting details.
RDG 061-Understand multiple word meanings, uses synonyms

Entrance Skills

Develop, organize and express ideas in both expository and research papers.

Requisite Course Objectives

ENG 061-Use theses to organize paragraphs into coherent analyses.
ENG 061-Demonstrate the ability to think critically and express ideas using various patterns of development.
ENG 061-Recognize features of style such as purpose, audience and tone integrate these elements into academic and professional writing.
ENG 061-Demonstrate the ability to use research skills including library resources such as books, periodicals, electronic databases and online resources such as the internet.
ENG 061-Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text.
MATH 030-Develop the practice of defining terms, thinking accurately, establishing conclusions through deductive reasoning, realizing:i.the importance of precise definitions in every body of knowledge;ii.how axioms and postulates of mathematics are necessary assumptions given without proof;iii.how propositions build on postulates and how basic propositions are used to prove more advanced propositions.
MATH 030-Communicate effectively with the instructor and mathematical community using proper terminology and correct notation.
MATH 045-Recognize when a table, graph, or equation is linear and recognize when a scatterplot appears to show linear correlation and be able to describe this relationship and discuss how it does not necessarily reflect causation in written form.
MATH 045-Understand the definition of a function including the use of function notation, arrow diagrams, graphs, and terminology such as domain, range, independent variables, and dependent variables.
RDG 061-Read a variety of texts fluently.
RDG 061-Write organized summaries reactions that capture main idea and supporting details.
RDG 061-Understand multiple word meanings, uses synonyms

Entrance Skills

Exhibit appropriate vocabulary and style.

Requisite Course Objectives

ENG 061-Demonstrate the ability to use research skills including library resources such as books, periodicals, electronic databases and online resources such as the internet.
ENG 061-Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text.
MATH 030-Develop the practice of defining terms, thinking accurately, establishing conclusions through deductive reasoning, realizing:i.the importance of precise definitions in every body of knowledge;ii.how axioms and postulates of mathematics are necessary assumptions given without proof;iii.how propositions build on postulates and how basic propositions are used to prove more advanced propositions.
MATH 030-Communicate effectively with the instructor and mathematical community using proper terminology and correct notation.
MATH 040-Apply the definition of a function including function notation and terminology (domain and range).
MATH 045-Recognize when a table, graph, or equation is linear and recognize when a scatterplot appears to show linear correlation and be able to describe this relationship and discuss how it does not necessarily reflect causation in written form.
MATH 045-Understand the definition of a function including the use of function notation, arrow diagrams, graphs, and terminology such as domain, range, independent variables, and dependent variables.
MATH 045-Understand the definitions one-to-one and inverse functions, including log functions, and observe them in applications from statistics and financial mathematics.

MATH 045-Investigate and practice general problem solving strategies, including Polya's problem solving techniques, pattern analysis, inductive and deductive reasoning examples, and estimation techniques for predicting feasible answers and discovering errors.
RDG 061-Write organized summaries reactions that capture main idea and supporting details.
RDG 061-Understand multiple word meanings, uses synonyms

Entrance Skills

Demonstrate independent study skills and learning habits.

Requisite Course Objectives

ENG 061-Demonstrate the ability to use research skills including library resources such as books, periodicals, electronic databases and online resources such as the internet.
MATH 030-Develop intellectual maturity beyond mere recitation and rote learning of the facts of geometry.
MATH 045-Investigate and practice general problem solving strategies, including Polya's problem solving techniques, pattern analysis, inductive and deductive reasoning examples, and estimation techniques for predicting feasible answers and discovering errors.
RDG 061-Read a variety of texts fluently.

Entrance Skills

Connect information gained from textbook readings and lectures to other disciplines.

Requisite Course Objectives

ENG 061-Demonstrate the ability to use research skills including library resources such as books, periodicals, electronic databases and online resources such as the internet.
ENG 061-Demonstrate the ability to read and respond in writing beyond the literal interpretation of the text.
MATH 030-Develop the practice of defining terms, thinking accurately, establishing conclusions through deductive reasoning, realizing:i.the importance of precise definitions in every body of knowledge;ii.how axioms and postulates of mathematics are necessary assumptions given without proof;iii.how propositions build on postulates and how basic propositions are used to prove more advanced propositions.
MATH 030-Develop intellectual maturity beyond mere recitation and rote learning of the facts of geometry.
MATH 030-Communicate effectively with the instructor and mathematical community using proper terminology and correct notation.
MATH 045-Recognize when a table, graph, or equation is linear and recognize when a scatterplot appears to show linear correlation and be able to describe this relationship and discuss how it does not necessarily reflect causation in written form.
MATH 045-Investigate and practice general problem solving strategies, including Polya's problem solving techniques, pattern analysis, inductive and deductive reasoning examples, and estimation techniques for predicting feasible answers and discovering errors.
RDG 061-Read a variety of texts fluently.
RDG 061-Write organized summaries reactions that capture main idea and supporting details.

Course Content

1. Numeration systems
   a. history
   b. Hindu-Arabic numeration system
   c. place value systems
2. Integers
   a. structure and basic properties
   b. computational algorithms
3. Basic set theory and logic
   a. set operations
   b. Venn Diagrams
   c. DeMorgan's Laws
   d. truth tables and equivalent statements
   e. deductive reasoning
   f. contradictions and tautologies
4. Basic number theory
   a. divisibility
   b. prime and composite numbers
   c. prime factorization

   d. fundamental theorem of arithmetic
   e. least common multiple and greatest common divisor
5. Rational numbers
   a. structure and properties
   b. ratio and proportion
6. Real numbers
   a. structure and basic properties
   b. arithmetic operations
   c. rational numbers and their fractional and decimal representations
   d. irrational numbers
   e. number line representation
7. Number Sense
   a. patterns
   b. advanced level problem solving
   c. communication
   d. connections
   e. modeling
   f. mathematical reasoning
8. Geometry
   a. geometric shapes
   b. measurement of length, area, and volume of geometric figures
   c. English and Metric systems
   d. coordinate geometry including distance, slope, equations in the coordinate plane, transformations, relations, and functions
9. National and state curriculum standards for elementary school math and implementation in the classroom.

Lab Content

1. Complete individual and group inquiry and investigations of concepts.
2. Complete contextualized assignments and manipulatives specific to elementary school pedagogy.
3. Participate in discussion of lecture material through discussion boards, presentations, and group projects to improve understanding of and communications skills involving mathematics.
4. Work on either paper or web-based worksheets to practice skills learned in lectures.
5. Solve logic puzzles, play games, and analyze principles individually and in groups.

Course Objectives

	Objectives
Objective 1	Demonstrate comprehension of common arithmetic algorithms within alternate place value systems.
Objective 2	Illustrate a variety of equivalent arithmetic algorithms and understand the advantages and disadvantages of applying equivalent algorithms in different circumstances.
Objective 3	Analyze the divisibility of numbers through the application of number theory.
Objective 4	Analyze least common multiples and greatest common divisors and their role in standard algorithms.
Objective 5	Represent rational numbers as both fractions and decimals. Explore arithmetic algorithms for these two representations and justify their equivalence.
Objective 6	Analyze the structure and properties of the sets of integers, rational numbers, and real numbers.
Objective 7	Describe the concepts of rational and irrational numbers and their differences, including their decimal representations. Illustrate the use of a number line representation.
Objective 8	Demonstrate conceptual understanding of mathematical topics through the use of patterns, problem solving, communication, connections among multiple concepts, and modeling.
Objective 9	Demonstrate understanding of set theory and logic.
Objective 10	Apply set operations, Venn Diagrams, DeMorgan's Laws, truth tables to demonstrate equivalence of statements, and deductive reasoning and identify contradictions and tautologies.
Objective 11	Recognize a variety of geometric shapes and the relationships between geometric shapes.
Objective 12	Apply measurements of length, area, and volume to geometric shapes.
Objective 13	Use coordinate geometry, apply the Pythagorean Theorem via the distance formula, calculate and use slope, find and interpret equations in the Cartesian coordinate plane, and graph relations and functions.
Objective 14	Illustrate transformation geometry of congruence and similarity using slides (translations), reflections, and rotations.

Objective 15	Apply geometric concepts to tessellate the plane.
Objective 16	Develop activities implementing state and national curriculum standards.

Student Learning Outcomes

	Upon satisfactory completion of this course, students will be able to:
Outcome 1	Evaluate the equivalence of numeric algorithms and explain the advantages and disadvantages of equivalent algorithms in different circumstances.
Outcome 2	Recognize the patterns found in mathematics and explain how those patterns facilitate the understanding of mathematics and number sense.
Outcome 3	Analyze multiple approaches to solving various problems from elementary and advanced levels of mathematics related to sets, functions, and logic.
Outcome 4	Design mathematical lesson plans for students in Prekindergarten - 6th grades that implement age-appropriate curriculum standards.

Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Lecture	Lecture will be used for introduction and explanation of course topics.
Discussion	Discussion will be used to review, explore, analyze, and evaluate various methods of solution.
Technology-based instruction	Video presentations may be used to introduce and explain new topics or demonstrate examples of concepts and activities used in primary and elementary school classrooms.
Activity	Students will solve puzzles individually and in groups to explore concepts and to practice in-class activities that may be used in primary and elementary school classes.
Laboratory	Labs will be used for student exploration (individually or in groups) of the topics of the course.

Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
Laboratory projects	Worksheets and write-ups of activities related to mathematical concepts covered in lecture and elementary school pedagogy.	In and Out of Class
Written homework	Homework assigned from text, online, and/or by means of worksheets requiring at least six hours per week.	Out of Class Only
Mid-term and final evaluations	Students will be evaluated by a comprehensive 2-hour final exam.	In Class Only
Other	Students will be evaluated by examinations involving problems that require the application of studied principles and skills to new situations as well as problems that mimic those done on homework and in lab activities.	In and Out of Class
Student participation/contribution	Students will be evaluated by their participation in lab activities and classroom discussion. They may be required to turn in write-ups of these activities.	In Class Only
Laboratory projects	Activities that allow students to demonstrate their mastery of the learning objectives and their ability to devise, organize and present complete solutions to problems.	In and Out of Class
College level or pre-collegiate essays	Students may be evaluated by writing summaries and analyses of mathematical and pedagogical concepts.	In and Out of Class

Assignments

Other In-class Assignments

1. Attend classroom lectures and take notes.
2. Participate in non-graded activities and discussion groups to review, analyze, diagnose, and evaluate various methods of solution used on homework and in for-credit lab activities.

Other Out-of-class Assignments

1. Read textbook and supplementary assignments.
2. Complete other assigned homework such as pretests, projects, or take-home tests involving problems that require the application of studied principles and skills to new situations as well as problems that mimic those done on homework and in class.
3. Review notes.
4. Complete lab investigations and other assignments started in class.

Grade Methods

Letter Grade Only

Comparable Transfer Course Information

University System

CSU

Campus

CSU Los Angeles

Course Number

MATH 1100

Course Title

Foundations of the Real Number System for Elementary and Middle School Teachers

Catalog Year

2018-2019

University System

CSU

Campus

CSU Dominguez Hills

Course Number

MATH 107

Course Title

Mathematics for Elementary School Teachers: Real Numbers

Catalog Year

2016-2017

University System

CSU

Campus

California State Polytechnic University, Pomona

Course Number

MATH 1940

Course Title

Mathematical Concepts for Elementary School Teachers: Number Systems

Catalog Year

2018-2019

University System
CSU
Campus
CSU Stanislaus

Course Number
MATH 3030
Course Title
Geometry for Teachers

Catalog Year
2018-2019

University System
CSU
Campus
CSU Los Angeles

Course Number
2250
Course Title
Explorations in Geometry for Elementary and Middle School Teachers

Catalog Year
2018-2019

COD GE
C4.B - Language and Rationality - Communication and Analytical Thinking

CSU GE
B4 - Mathematics

MIS Course Data

CIP Code
27.0101 - Mathematics, General.

TOP Code
170100 - Mathematics, General

SAM Code
E - Non-Occupational

Basic Skills Status
Not Basic Skills

Prior College Level
Not applicable

Cooperative Work Experience
Not a Coop Course

Course Classification Status
Credit Course

Approved Special Class
Not special class

Noncredit Category
Not Applicable, Credit Course

Funding Agency Category
Not Applicable

Program Status
Program Applicable

Transfer Status
Transferable to both UC and CSU

General Education Status
Mathematics/Quantitaive Reasoning/Analytical Thinking

Support Course Status
Course is not a support course

C-ID
MATH 120

Allow Audit
No

Repeatability
No

Materials Fee
No

Additional Fees?
No

Approvals

Curriculum Committee Approval Date
10/01/2019

Academic Senate Approval Date
10/10/2019

Board of Trustees Approval Date
11/13/2019

Chancellor's Office Approval Date
6/08/2020

Course Control Number
CCC000550981

Programs referencing this course
Liberal Arts: Math and Science AA Degree (http://catalog.collegeofthedesert.eduundefined?key=29/)
Elementary Teacher Education AA-T Degree (http://catalog.collegeofthedesert.eduundefined?key=5/)