DREYFOUS

Thematic guide

PRE-ALGEBRA

DREYFOUS

TABLE OF CONTENTS

Course Description

The main objective of the Pre-Algebra course is to prepare the student with the necessary knowledge for the study of Algebra. The concepts studied in this course are fundamental to formalize the study of disciplines such as Geometry and Algebra, among others. This knowledge will allow students to continue to study mathematical subjects in greater depth, since learning these concepts will serve as a basis for the following grades. The contents of this course are aligned with the Estándares de contenido y expectativas de grado (2014) of the Puerto Rico Department of Education, as well as the United States *Common Core State Standards*. Students will make connections between the standards topics of algebra, numbering and operation, geometry, measurement, and data analysis. The pedagogical approach is focused on teaching mathematics for problem solving and the development of critical thinking skills as a means for the integral formation of the human being. The course emphasizes connecting curricular content to the solution of real-life problems so that the student finds relevance in the topics discussed and this awakens their interest in mathematics. In addition, content from disciplines such as Science, Technology and Engineering, among others, is integrated to allow students to gain knowledge in other areas, and to understand the importance of mathematics as a universal discipline.

The Pre-Algebra course includes topics that address standards such as: The set of real numbers, algebraic expressions, ratios, proportions, percentages, linear equations and inequalities, points, lines, angles, circles and circumferences, data representation and analysis, three-dimensional figures, data representation and analysis, and the probability of events

The outline of objectives by lesson takes into consideration all the skills and concepts necessary for the student to establish the connections between the different standards in which mathematics is currently categorized. The general objectives contemplated in the Pre-Algebra course are very much in line with the PRDE. Among these objectives there is:

1. To use the understanding of rational numbers, their properties and the order of operations to solve daily-life problems that include various frameworks, such as financial decisions, calculation of distances and comparing temperatures.
2. To use ratios, proportions, and percentages to solve problems in everyday life such as calculating taxes, prizes, tips, and prices of items on sale.
3. To apply the order of operations to write, evaluate and simplify numerical expressions that model daily life situations and solve problems.
4. To identify the every-day relations that can be modeled with linear equations. The student will also be able to interpret what the slope and Y intercept tells us about that relation.

5. To understand how to use the characteristics of two- and three-dimensional figures such as perimeter, area, surface and volume to describe and model the world around them.
6. To use statistical data in a critical manner and critically analyze statistical information presented by others. 7. At the end of this unit, the student will be able to represent and analyze daily life events using a probability model.

The teaching method focuses on conceptual understanding, skill development and mathematical problem solving, together with the development of critical thinking skills, as a means for the integral formation of the student.

The course deliberately integrates content related to natural sciences, social sciences, technology and engineering, among others, with a double purpose: to encourage the student to see the direct application of what he or she learns and to visualize the importance of mathematics as a universal discipline at the service of society and its institutions. On the other hand, the incorporation of situations and problems of daily life in each of the topics discussed aims to awaken interest in the student towards the study of the discipline. The Pre-algebra course aims to make the student understand the importance of mathematics and for them to know how to apply it in decision making to solve various problems and reach their own conclusions. The student is expected to be able to communicate appropriately using scientific and mathematical terminology as well as use technology appropriately. Finally, it is expected that the student will be able to recognize the relevance of mathematics in personal and professional life.

Course Structure

The Pre-algebra course consists of nine units carefully subdivided into different lessons. The number of lessons per unit depends on the scope and depth with which the different topics are discussed and developed. Each lesson has an interactive presentation divided, in turn, into sections that present and explain the contents of the topic to be studied. Each presentation includes conceptual definitions, concrete examples, explanations, multiple representations, practice exercises, application of concepts and skills in everyday life.

In addition, the lessons include practice exercises, quizzes, additional practice labs, assignments, self-assessment exercises and a descriptive log with detailed information for the teacher, as well as a variety of internet links, among other resources. In turn, the lessons include worksheet assignments that reinforce the concepts studied in each lesson. The activities are varied and flexible, with the purpose of satisfying the particular needs and interests of each student. The practice and self-assessment activities seek to make the student aware of their strengths and weaknesses in the mastery of the content, with the purpose of them gradually taking control of their learning. The teacher, as an integral and essential part of the process, will have the responsibility of stimulating, orienting, guiding and periodically evaluating the learning achieved of each student.

The units are made up of the following parts:

Lessons

Each unit is made up of different lessons, divided into topics, macro concepts and skills. In turn, each lesson consists of five key elements: course presentation or content, documents in digital format (PDF), internet links, self-assessment and descriptive Log.

- **Lesson Content.** Each lesson content presented contains a detailed explanation of the concepts and skills of the lesson as established in the objectives. In addition, it consists of the following elements that systematically contribute to the development of the desired learning in the student:
  - **Examples.** In each section, when skills are developed, examples that explain step-by-step the solution to an exercise or problem are included, so that the student reviews the concepts and skills presented.

  - **Practice.** This includes a series of carefully selected exercises in order for the student to practice the skills and concepts discussed. Its purpose is to periodically compare the learning achieved by the student before continuing with other subjects and skills. It does not include procedures or explanations, it only includes the solution of the exercises.

- **Solution.** It is used to keep the solution to an exercise or problem that the student should try to answer hidden. Once you click on this icon, the solution or answer to the exercise will be displayed.

- **Process.** It is a label behind which the steps or the algorithm to follow when solving an exercise or problem appear.

- **Demonstration / Steps.** It presents formal demonstrations of the derivation of important formulas or algorithms.

- **Calculator.** It includes the explanation of the processes when using and handling the calculator to solve the section's exercises. It also connects the student to the virtual graphing calculator.

- **Animation.** It gives access to explanations, procedures or graphics that visually show the concepts and skills discussed in the section. It ensures that the development and conceptual understanding of the student is looked after.

- **Definition.** It includes formal mathematical definitions of concepts and processes mentioned or discussed.

- **Biography.** Includes a short biography of the mathematician or scientist who is credited with developing the definition, formula, procedure, or demonstration used in the lesson.

- **Note.** This icon points out common errors or reinforces details that should not be forgotten.

- **Did you know...** This section presents an explanation or situation that connects aspects of everyday life with the mathematical skills and concepts discussed. In some cases, this section shows the link between the development of logical thinking in humans with certain mathematical skills and processes.

- **Tabs.** They are located on the right side of the presentation, and can be maroon or blue. They unfold to the left, and include flow charts, biographies, notes, photos, explanations, suggestions, reminders, Did you know... or necessary background knowledge.

- **Incorrect.** Indicates when the student has selected an incorrect answer in the included practice exercises.

- **Correct.** Indicates the correct selection to the answer of an exercise or practice problem.

- **Photo or image.** Connects a particular explanation to a photo or image.

- **Video.** It accesses a short video that links mathematical content to everyday life.

- **Internet.** It is a direct link to a site or Internet portal closely related to the topic.

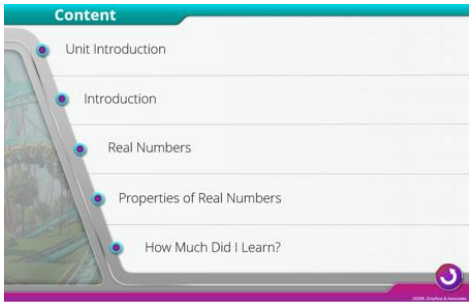
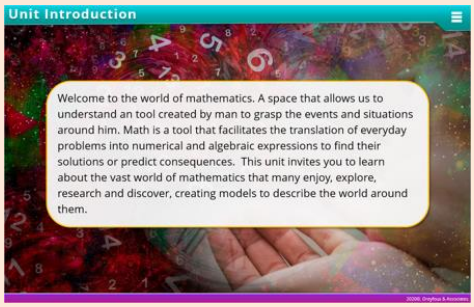
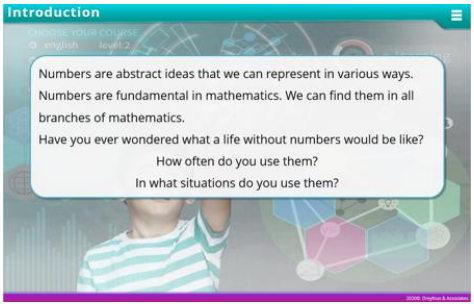
Each of the sections included in the presentation is connected to a particular icon that identifies it, as shown in the explanation provided. In the initial presentations of the course, the icon with the word that describes the section is included, this way the student will become familiar with what each of the icons represents. In the presentations that follow only the icon that accesses the section is included. In the presentations that follow only the icon that accesses to the section is included.

- **PDF documents.** These documents include a copy of practice exercises from the lesson, an additional practice section, activities that require the use of a calculator, or

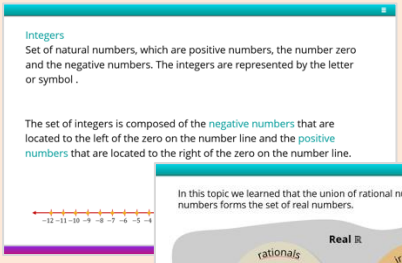
assignments. These documents can be printed out for the student to work on in pencil and on paper. Assignments are exercises and problems that the student works on at home, and that allow them, through practice, to strengthen the skills and concepts learned. Assignments are optional.

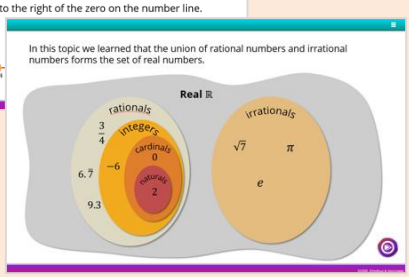
- **Internet Links.** These links are a direct connection to the Internet, and can be accessed directly from the presentation. They include additional explanations, examples, applications or demonstrations that allow students' conceptual development in the skills and topics discussed.
- **Self-assessment.** It consists of practice tests that the student answers to monitor their own learning before taking the formal unit evaluation tests offered by the teacher.
- **Descriptive Log.** This is the detailed lesson plan. This includes specific lesson objectives, standards and expectations, teaching strategies and resources, concepts, Internet links and references, among others. The only person with access to the descriptive logs will be the teacher.

Course Structure: Curricular Components

Lesson content	
Cover 	This is the presentation letter of the course and the lesson. Identifies the course, the unit, and the lesson. It contains: ○ Course title ○ Unit and lesson title ○ Image ○ Credits
Directory 	Presents the section and topics of the lesson. Each button has a hyperlink to the section it represents.
Unit Introduction 	It is a section found only in the first lesson of each unit.
Introduction 	This section is found in all lessons.

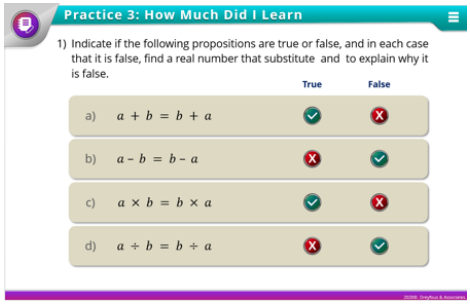
Topics (content)





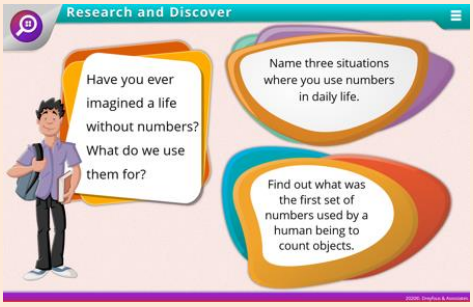
Development of the content with definitions, explanations, examples and demonstrations.

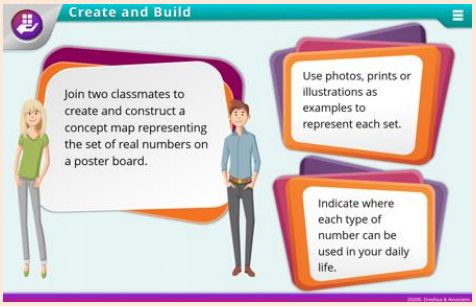
How Much Did I Learn?



Short and objective exercises aimed at the evaluation and application of knowledge, located at the end of the development of the topics. Contains the solutions.

Special sections

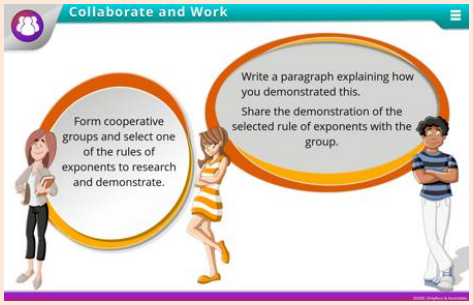


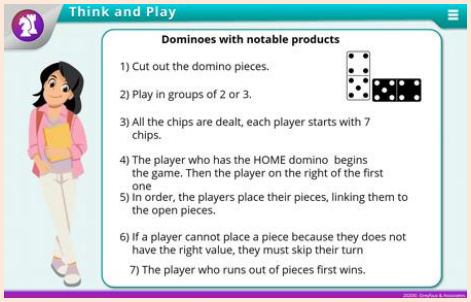


These broaden students' learning experiences. One or more of these may appear in the lesson. They will be included in the lesson when relevant. These sections are as follows:

Research and Discover: Research on additional topics or integration with other subjects.

Create and Build: Applications of what has been learned and creation of projects.

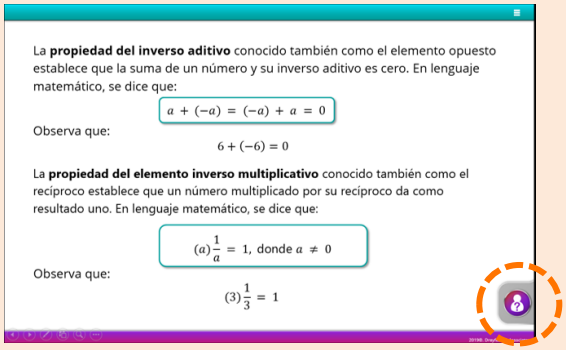


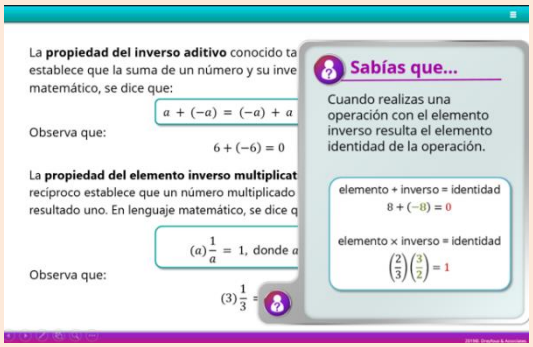


Collaborate and Work: Opportunity for collaborative or cooperative work to exchange knowledge.

Think and Play: Integration of a playful strategy for the development of concepts and skills.

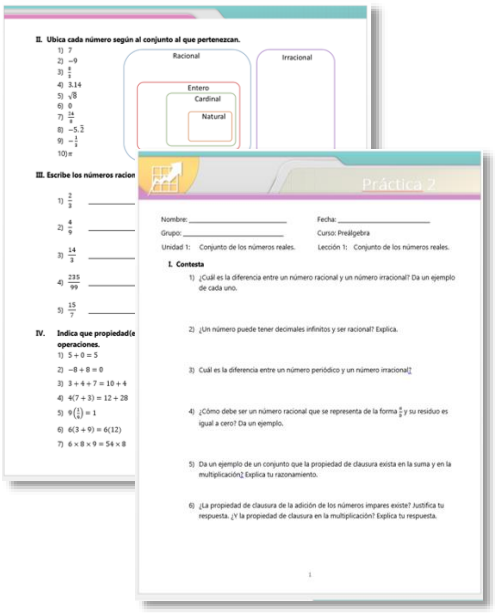
The Tab





By clicking the gray tab at the top or bottom right of some of the *Lesson Content* slides, the student will be able to see some important notes to reinforce or clarify the content, such as formulas or prior definitions.

Button Directory			
Navigation			
	Close		Credits
	Solution		Return
Generals			
	Animation		Practice
	LInk		Reason
	Definition		Review
	Biography		Steps
	Connect what you have learned		Graph
	Image		Calculator
	Note		Example
	Diagram		Self-assessment.
	Question		Process

	Video		Zoom
	Did you know...		Text
	Challenge your mind		Information
Special sections			
	Research and Discover		Create and Build
	Collaborate and Work		Think and Play
Work Documents			
Objective Exercises  II. Ubica cada número según al conjunto al que pertenezcan. 1) 7 2) −9 3) $\frac{5}{2}$ 4) 3.14 5) $\sqrt{8}$ 6) 0 7) $\frac{24}{4}$ 8) $-5.\overline{2}$ 9) $-\frac{1}{3}$ 10) π Racional Irracional Entero Cardinal Natural III. Escribe los números racion 1) $\frac{2}{3}$ _____ 2) $\frac{4}{9}$ _____ 3) $\frac{14}{3}$ _____ 4) $\frac{235}{99}$ _____ 5) $\frac{15}{7}$ _____ IV. Indica que propiedad(e operaciones. 1) 5 + 0 = 5 2) −8 + 8 = 0 3) 3 + 4 + 7 = 10 + 4 4) 4(7 + 3) = 12 + 28 5) $9\left(\frac{1}{9}\right) = 1$ 6) 6(3 + 9) = 6(12) 7) 6 × 8 × 9 = 54 × 8 Práctica 2 Nombre: _____ Fecha: _____ Grupo: _____ Curso: PreÁlgebra Unidad 1: Conjunto de los números reales. Lección 1: Conjunto de los números reales. I. Contesta 1) ¿Cuál es la diferencia entre un número racional y un número irracional? Da un ejemplo de cada uno. 2) ¿Un número puede tener decimales infinitos y ser racional? Explica. 3) Cuál es la diferencia entre un número periódico y un número irracional? 4) ¿Cómo debe ser un número racional que se representa de la forma $\frac{a}{b}$ y su residuo es igual a cero? Da un ejemplo. 5) Da un ejemplo de un conjunto que la propiedad de clausura exista en la suma y en la multiplicación? Explica tu razonamiento. 6) ¿La propiedad de clausura de la adición de los números impares existe? Justifica tu respuesta. ¿Y la propiedad de clausura en la multiplicación? Explica tu respuesta.	They are found in all lessons and provide the key for the teacher. ○ Practice 1 and 2 ○ Activity		

Unit Breakdown

The titles of each unit will be detailed below, and the content of the units will be broken down into lessons with their titles, codes, objectives, topics, concepts and vocabulary.

Unit 1. Set of Real Numbers

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 1. Set of Real Numbers

Code: C339G0SU01L01

Objectives

At the end of the lesson the student will:

- classify real numbers.
- define the rational and irrational numbers.
- define the integers, cardinal and natural numbers.
- explain the closure property of reak numbers.

Topics

- Real Numbers
- Properties of Real Numbers

Concepts

- cardinal
- irrational
- natural
- integers
- real
- closure property
- rational

Vocabulary

- associative
- cardinal
- closure
- commutative
- distributive
- integers
- identity
- inverse
- irrational
- natural
- periodic
- rational

Lesson 2. Set Theory

Code: C339G0SU01L02

Objectives

At the end of the lesson the student will:

- write sets in descriptive or list form.
- identify the finite and infinite sets.
- determine whether or not an element belongs to a set.
- define the null or empty set.
- determine the junction and intersection of sets.
- determine the subsets of a set.

Topics

- Sets
- Set Operations
- Subsets

Concepts

- finite set
- infinite set
- null set
- empty set
- element of a set
- intersection of sets
- subset
- set theory
- union of sets

Vocabulary

- complement
- set
- difference
- element
- finite
- infinite
- intersection
- subset
- union
- universe

Lesson 3. Set of Integers Numbers

Code: C339G0SU01L03

Objectives

At the end of the lesson the student will:

- identify the integers in a set and on the number line.
- perform operations with integers.
- apply the properties of the integers:

        - associative
        - commutative
        - distributive
        - identity
        - inverse

Topics

- Integers
- Operations with Integers
- Powers of a Number

Concepts

- additive
- distance
- estimate
- identity
- inverse
- negative
- opposite
- order of operations
- coordinates plane
- positive
- associative property
- commutative property
- distributive property
- numeric line
- numeric line
- absolute value

Vocabulary

- Coordinates
- distance
- inverse
- absolute value

Lesson 4. Set of Rational Numbers

Code: C339G0SU01L04

Objectives

At the end of the lesson the student will:

- define and classify rational numbers.
- convert finite decimal numbers into fractions and vice versa.
- carry out operations with the rational numbers.
    - **fractionals
    - decimals

Topics

- Rational Numbers

- Operations with Fractions
- Operations with Decimals
- Fractions and Decimals

Concepts

- fractions
- finite decimal numbers
- periodic numbers
- rational numbers
- operations with rationals

Vocabulary

- decimal
- finite
- infinite
- periodic
- rational

Lesson 5. Powers

Code: C339G0SU01L05

Objectives

At the end of the lesson the student will:

- define power.
- perform operations with integer exponents.
- simplify expressions with integer exponents.
- express decimal numbers in scientific notation.

Topics

- Integer Exponents
- Scientific Notation

Concepts

- base
- exponent
- scientific notation
- power
- repetition

Vocabulary

- base
- exponent
- power

Lesson 6. Square Roots

Code: C339G0SU01L06

Objectives

At the end of the lesson the student will:

- define the square root.
- simplify square roots.
- approximate non perfect square roots.
- calculate expressions with square roots using the calculator.

Topics

- Square Roots
- Estimating Square Roots
- Pythagoras Theorem

Concepts

- index
- multiplication
- irrational numbers
- powers
- radical
- radicand
- square roots

Vocabulary

- index
- radical
- radicand
- root

Unit 2. Algebraic Expressions

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 1. Algebraic Translation

Code: C339G0SU02L01

Objectives

At the end of the lesson the student will:

- write and understand terminology related to algebraic expressions.
- identify the elements in algebraic expressions.
- define polynomial.
- classify algebraic expressions as polynomial or non-polynomial.
- translate verbal expressions into algebraic expressions and vice versa.

Topics

- Algebraic Terms
- Algebraic Translation

Concepts

- coefficient
- constant
- algebraic expressions
- order of operations
- polynomial
- problem solving
- expression translation
- variables

Vocabulary

- coefficient
- constant
- expression
- polynomial
- variable

Lesson 2. Evaluating Algebraic Expressions

Code: C339G0SU02L02

Objectives

At the end of the lesson the student will:

- evaluate algebraic expressions using the substitution method.
- apply the order of operations to simplify algebraic expressions.
- generate tables of values from an algebraic equation of two variables.

Topics

- Order of Operations
- Evaluating Algebraic Expressions

- Table of Values

Concepts

- evaluate algebraic expressions
- order of operations
- substitution
- table of values

Vocabulary

- evaluation
- expression

Lesson 3. Operations with Algebraic Expressions

Code: C339G0SU02L03

Objectives

At the end of the lesson the student will:

- identify similar terms.
- apply the laws of exponents.
- simplify algebraic expressions.
  - addition and subtraction of polynomials
  - multiplication and division of polynomials.
- solve problems using algebraic expressions.

Topics

- Similar terms
- Addition and Subtraction of Polynomials
- Law of Exponents
- Multiplication and Division of Polynomials.

Concepts

- base
- coefficient
- exponent
- exponents
- algebraic expressions
- law of exponents
- polynomial
- distributive property
- simplify expressions
- similar terms
- variables

Vocabulary

- base
- coefficient
- exponent
- expression
- monomial

- polynomial
- similar
- variable

Lesson 4. Factorization

Code: C339G0SU02L04

Objectives

At the end of the lesson the student will:

- perform prime factorization.
- simplify rational algebraic expressions.
- solve problems using algebraic expressions.
- *use the greatest common to factor expressions.

Topics

- Factors
- Prime Factorization
- Common Factor
- Difference of Squares

Concepts

- expression
- factorization
- prime factorization
- greatest common factor
- **composite number
- prime number
- distributive property

Vocabulary

- composite
- factorization
- prime

Unit 3. Ratios, Proportions, and Percentages

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 1. Ratio and Proportion

Code: C339G0SU03L01

Objectives

At the end of the lesson the student will:

- define the concepts of reason and proportion.
- apply the properties of the proportions.
- solve proportions.
- **include the concept of a associated rate with ratio.
- solve verbal problems involving the unit rate.
- solve problems involving speed, average, distance and time.

Topics

- ratio and proportion
- solving proportions
- rates

Concepts

- denominator
- distance
- equivalent
- complex fraction
- numerator
- proportion
- ratio
- rate of change
- rate
- unit rate
- time
- speed

Vocabulary

- proportion
- rate
- unit

Lesson 2. Percentage

Code: C339G0SU03L02

Objectives

At the end of the lesson the student will:

- understand the concept of percentage.
- write a ratio as a decimal percentage.
- write a percentage as a ratio or decimal.

- solve problems involving percentages.
  - percent of a quantity.
  - part corresponding to the percentage.
  - total corresponding to the percentage.

Topics

- Percentage
- Calculate the Percentage

Concepts

- decimal
- percentage
- percent
- ratio

Vocabulary

- decimal
- percentage
- percent

Lesson 3. Rate of Change

Code: C339G0SU03L03

Objectives

At the end of the lesson the student will:

- determine whether a proportion is direct or indirect.
- identify in different representations (tables, graphs) if there is a constant rate of change.
- plot graphs of relations with constantly changing ratios.
- solve daily-life problems using the rates of change and the direct and indirect proportions.

Topics

- Direct and Indirect Proportion
- Rate of Change

Concepts

- direct proportion
- indirect proportion
- ratio
- constant rate of change
- relation

Vocabulary

- relation

Unit 4. Linear Equations and Inequalities

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 1. Linear Equations

Code: C339G0SU04L01

Objectives

At the end of the lesson the student will:

- know the meaning of term, coefficient, variable, constant, and equation.
- solve linear equations in one variable with addition and subtraction.
- solve linear equations in one variable with multiplication and division.
- solve linear equations in one variable with combined operations.

Topics

- Solving Linear Equations with Addition and Subtraction
- Solving Linear Equations with Multiplication and Division
- Solving Linear Equations

Concepts

- coefficient
- constant
- linear equation
- graphs
- straight line
- solving equation
- term
- variable

Vocabulary

- coefficient
- constant
- linear
- term

Lesson 2. Linear Inequalities

Code: C339G0SU04L02

Objectives

At the end of the lesson the student will:

- know the meaning of inequality.
- represent a linear inequality on the number line.
- solve linear inequalities in one variable with addition and subtraction.
- solve inequalities in one variable with multiplication and division.
- solve linear inequalities in one variable with combined operations.
- solve compound inequalities.

Topics

- Solving Linear Inequalities with Addition and Subtraction
- Solving Linear Inequalities with Multiplication and Division
- Solving Combined Linear Inequalities

Concepts

- inequality
- linear inequality
- double inequalities
- interval
- greater than
- less than
- solving inequalities

Vocabulary

- inequality
- inequality
- interval

Lesson 3. Equations and Inequalities with Absolute Value

Code: C339G0SU04L03

Objectives

At the end of the lesson the student will:

- know the meaning of absolute value.
- solve linear equations with absolute value in a variable with addition and subtraction.
- solve linear equations with absolute value in a variable with multiplication and division.
- solve linear inequalities with absolute value in a variable with combined operations.
- recognize the relationship between absolute value and inequities.
- solve compound inequalities.

Topics

- Absolute Value
- Solving Equations with Absolute Value
- Solving Inequalities with Absolute Value

Concepts

- distance between points
- equation
- equations with absolute value
- inequality
- inequalities with absolute value
- interval
- greater than
- less than

- absolute value

Vocabulary

- distance
- absolute value

Lesson 4. Linear Equations with Two Variables

Code: C339G0SU04L04

Objectives

At the end of the lesson the student will:

- identify a linear relation and the dependent and independent variables in different representations:
  - tables
  - graphs
  - words
- draw the graph of a linear equation with two variables.
- determine the rate of constant change of a linear relation.
- identify the intercept of the line graph with the axes of the coordinates plane.

Topics

- Linear Relations with Two Variables
- Constant rate of change
- Slope

Concepts

- Linear Equations with Two Variables
- graph
- intercept
- intercept
- straight line
- constant rate of change
- table
- dependent variable
- independent variable

Vocabulary

- dependent
- independent
- intercept

Lesson 5. Equation of the Line

Code: C339G0SU04L05

Objectives

At the end of the lesson the student will:

- Draw the graph of the linear equation.
- determine the constant rate of change (slope) by knowing two points on the line.

- determine the equation of the line given the constant rate of change (slope) and the intercept in the ordinate.
- determine the equation of the line by knowing the constant rate of change (slope) and any point.
- determine the equation of the line by knowing any two points.
- **solve daily-life applications problems.

Topics

- Equation of the Line
- Slope-intercept Equations
- Point-slope Equations

Concepts

- equation of the line
- linear function
- intercept
- slope
- constant ratio
- rate of change

Vocabulary

- slope

Unit 5 Points, Lines, and Angles

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 1. Lines and Straight Lines**

Code: C339G0SU05L01

Objectives

At the end of the lesson the student will:

- identify and draw open and closed lines.
- identify and draw convex and concave lines.
- identify and draw straight lines.
- will identify and draw segments and semi-straight lines.
- will find the distance between two points on the line.

Topics

- Lines and Straight Lines**
- Segment Operation
- Distance Between two Points

Concepts

- intersection
- open line
- closed line
- concave line
- convex line
- straight line
- parallels
- Perpendicular
- point
- ray
- segment
- segment
- semi-line

Vocabulary

- concave
- convex
- line
- parallel
- perpendicular
- segment
- semi-line

Lesson 2. Angles

Code: C339G0SU05L02

Objectives

At the end of the lesson the student will:

- define angle.
- write down the different nomenclatures for an angle.
- determine the measurement of the angles.
- classify the angles according to their size.
- know different systems of angle measurement.

Topics

- Angle
- Measure and Classification of Angles
- Operations with Angles

Concepts

- acute angle
- straight angle
- obtuse angle
- right angle
- compound angles
- coterminal angles
- complementary
- concave
- consecutive
- convex
- degree
- minutes
- seconds
- supplementary

Vocabulary

- acute
- angle
- complementary
- coterminal
- degree
- **straight
- minute
- obtuse
- right
- second
- supplementary

Lesson 3. Polygons

Code: C339G0SU05L03

Objectives

At the end of the lesson the student will:

- define polygon.
- identify and build regular polygons.
- define and differentiate the concepts of perimeter and area.
- define triangle.
    - classify triangles according to the size of their sides.
    - classify triangles according to the measure of their angles.
    - identify and describe the properties of the equilateral and isosceles triangles.
    - determine the sum of the interior angles of the triangle.
    - find the perimeter and the area of triangles.

Topics

- Polygons, Perimeter, and Area
- Triangles
- Quadrilaterals

Concepts

- interior angles of a triangle
- area
- sides of a triangle
- perimeter
- polygon
- regular polygon
- properties of a triangle
- triangle
- acute triangle
- equilateral triangle
- scalene triangle
- isosceles triangle
- obtuse triangle
- right triangle

Vocabulary

- acute
- area
- equilateral
- scalene
- isosceles
- obtuse
- perimeter
- polygon
- triangle

Lesson 4. Right Triangle and the Pythagorean Theorem

Code: C339G0SU05L04

Objectives

At the end of the lesson the student will:

- identify the parts of the right triangle.
- apply the Pythagorean theorem in problem solving.
- prove Pythagoras' theorem.

Topics

- Right triangle
- Pythagoras Theorem

Concepts

- legs
- hypotenuse
- Pythagoras Theorem
- right triangle

Vocabulary

- legs
- hypotenuse
- theorem

Lesson 5. Quadrilaterals

Code: C339G0SU05L05

Objectives

At the end of the lesson the student will:

- define quadrilateral.
- classify quadrilaterals in:
  - parallelogram
    - square
    - rhombus
  - **trapeziums
  - trapezoids
  - rhomboid (deltoid)
- calculate the perimeter and area of the quadrilaterals.

Topics

- Classifying of Quadrilaterals
- Properties of the Quadrilaterals
- Trapezoid and Mid-base

Concepts

- area
- square
- quadrilateral
- deltoid

- parallelogram
- perimeter
- rectangle
- rhombus
- rhomboid
- trapezium
- trapezoid

Vocabulary

- square
- quadrilateral
- parallelogram
- rectangle
- rhombus
- trapezium
- trapezoid

Lesson 6. Transformations

Code: C339G0SU05L06

Objectives

At the end of the lesson the student will:

- carry out polygon transformations:
  - translations
  - reflections
  - rotations
  - homothetic
- establish the relationship between the perimeter and the area of the polygons.

Topics

- Transformations
- Translations
- Reflections
- Rotations
- Homothetic

Concepts

- area
- scale
- similar figures
- homothetic
- corresponding sides
- model
- perimeter
- reflection
- rotation

- similarities
- transformations
- translation

Vocabulary

- homothetic
- similarity

Lesson 7. Similar figures

Code: C339G0SU05L07

Objectives

At the end of the lesson the student will:

- define similarity.
- establish the ratio between the measures of the elements concerned.
- identify changes in scale.
- interpret scale drawings.
- construct scale drawings.
- establish the relationship between the perimeter and the area.

Topics

- Similarity
- Proportions and scales

Concepts

- area
- congruence
- scale
- similar figures
- corresponding sides
- model
- perimeter
- similarity

Vocabulary

- scales
- model
- similarity

Unit 6. Circle and Circumference

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 1. Circumference

Code: C339G0SU06L01

Objectives

At the end of the lesson the student will:

- define angle.
- identify the elements of the circle.
  - radius
  - chord
  - diameter
  - arc
  - secant
  - tangent
- calculate the length of the circumference.

Topics

- Circumference
- Length of the Circumference

Concepts

- circumference
- chord
- radius

Vocabulary

- arc
- circumference
- chord
- diameter
- radius
- secant
- tangent

Lesson 2. Circle

Code: C339G0SU06L02

Objectives

At the end of the lesson the student will:

- define circle.
- calculate the area of a circle.
- define the segment and the circular sector.
- calculate the area of the segment and the circular sector.

Topics

- Circle

- Area of the Circle

Concepts

- arc
- area
- circle
- chord
- diameter
- radius
- circular sector
- circular segment

Vocabulary

- circle
- sector

Unit 7. Three-dimensional Figures

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 1. Polyhedron

Code: C339G0SU07L01

Objectives

At the end of the lesson the student will:

- define and identify the properties of the polyhedrons.
  - prisms
  - pyramids

Topics

- Polyhedron
- Prism
- Pyramid

Concepts

- pyramid
- polyhedron
- prism
- rectangular prism

Vocabulary

- pyramid
- polyhedron
- prism

Lesson 2. Round Bodies

Code: C339G0SU07L02

Objectives

At the end of the lesson the student will:

- define and identify the solids of revolution:
  - cone
  - sphere
  - cylinder

Topics

- Round Bodies
- Cone
- Cylinder
- Sphere

Concepts

- cylinder
- cone
- sphere

- solid of revolution

Vocabulary

- cylinder
- cone
- sphere
- revolution

Lesson 3. Surface Area

Code: C339G0SU07L03

Objectives

At the end of the lesson the student will:

- calculate the surface area of polyhedrons.
  - prisms
  - pyramids
- calculate the surface area of the round bodies.
  - cone
  - sphere
  - cylinder

Topics

- Surface Area of Polyhedrons
- Surface Area of Round Bodies

Concepts

- area
- cylinder
- cone
- round body
- drawing
- scale
- sphere
- graph
- map
- model
- perimeter
- pyramids
- polyhedron
- prisms
- unit of measure

Vocabulary

- map
- round

Lesson 4. Volume

Code: C339G0SU07L04

Objectives

At the end of the lesson the student will:

- calculate the volume of polyhedrons.
  - prisms
  - pyramids
- calculate the volume of round bodies:
  - cone
  - sphere
  - cylinder
- use the dihedral system (drawing techniques) to represent figures:
  - isometric paper
  - *grids
  - planes

Topics

- Volume of Polyhedrons
- Volume of Round Bodies

Concepts

- area
- cylinder
- cone
- round bodies
- sphere
- two-dimensional figures
- three-dimensional figures
- isometric paper
- perimeter
- pyramids
- planes
- polyhedron
- prisms
- grids
- dihedral system
- unit of measure
- volume

Vocabulary

- dihedral
- isometric
- grids
- volume

Unit 8. Representations and Data Analysis

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 1. Population and Samples

Code: C339G0SU08L01

Objectives

At the end of the lesson the student will:

- define population and sample.
- identify a representative sample of the population.
- collect a random sample from a population.

Topics

- Population and Samples

Concepts

- sample
- random sample
- representative sample
- population
- data collection
- tabulation

Vocabulary

- random
- data
- sample
- population
- tabulate

Lesson 2. Graphic Representations

Code: C339G0SU08L02

Objectives

At the end of the lesson the student will:

- collect and organize data using:
  - frequency table
  - box plot
  - stem-and-leaf display (display)
  - scatter plot
  - histogram

Topics

- Data collection and organization

Concepts

- data
- tree diagram
- parallel box diagram

- box plot
- scatter plot
- **stem-and-leaf display (display)
- distribution
- distribution
- graph
- graphs
- histogram
- tendency line
- data organization
- data collection
- data representation
- frequency table
- variable
- qualitative variable
- quantitative variable

Vocabulary

- qualitative
- quantitative
- diagram
- scatter
- frequency
- tendency
- variable

Lesson 3. Measures of Central Tendency

Code: C339G0SU08L03

Objectives

At the end of the lesson the student will:

- define the central tendency measures.
- determine the:
  - mode
  - mean (average)
  - median
  - mid-range
- determine the measures of variability:
  - range
  - variance
- calculate and interpret the standard deviation.

Topics

- Measures of Central Tendency

- Standard Deviation

Concepts

- statistical analysis
- conclusions
- standard deviation
- mean (average)
- median
- dispersion measures
- measures of central tendency
- variability measures
- mid-range
- mode
- sample
- parameter
- population
- range
- relation between variables
- variance

Vocabulary

- scatter
- standard
- mean (average)
- median
- mode
- range
- variability

Unit 9. Probability

At the end of this unit the student will have completed the objectives found in the following lessons.

Lesson 1. Sample Space

Code: C339G0SU09L01

Objectives

At the end of the lesson the student will:

- define sample space.
- determine the sample space using:
  - lists
  - contingency tables
  - tree diagram

Topics

- Sample Space

Concepts

- Sample Space
- Event
- Compound Event
- Contingency Table
- Tree diagram
- Counting
- Combinations

Vocabulary

- Combinations
- Counting
- Contingency
- Event

Lesson 2. Probability of an Event

Code: C339G0SU09L02

Objectives

At the end of the lesson the student will:

- identify relationships between events.
- construct Venn diagrams to represent the relationship between events.
- identify dependent and independent events.
- apply the sum of probabilities rule.
- determine the probability of simple events.
- determine the adjacent, complementary, and supplementary conditional probability.

Topics

- Probabilities
- Simple Events

- Complex Events

Concepts

- chance
- datum
- Venn diagram
- sample space
- event
- compound event
- dependent event
- independent event
- simple event
- frequency
- probability
- complementary probability
- conditional adjacent probability
- supplementary probability
- random event

Vocabulary

- random
- chance
- space
- probability

Lesson 3. Research Project

Code: C339G0SU09L03

Objectives

At the end of the lesson the student will:

- research probability models.
- identify the steps in a survey.
- design and develop a survey.

Topics

- Survey

Concepts

- frequency
- continuous model
- probability model
- discreet model
- uniform model
- research project

Vocabulary

- continuous
- discrete