

Secondary education 1

Lesson 1: Natural numbers

- Decimal numeral system
- Addition, subtraction, product and division
- Problem solving

Lesson 2: Divisibility

- Multiples and divisors
- Prime numbers
- Greatest common divisor
- Least common multiple

Lesson 3: Integers

- Negative numbers
- Representation of integers
- Addition, subtraction, product and division

Lesson 4: Fractions

- Definition of fraction
- Equivalent fractions
- Addition, subtraction, product and division

Lesson 5: Decimal numbers

- Definition of decimal number
- Addition, subtraction and product
- Division. Mixed operations.
- Approximations.

Lesson 6: Exponents and square roots.

- Powers
- Properties of exponents
- Square root

Lesson 7: Decimal metric system

- Length units.
- Weight units.
- Volume and surface units.

Lesson 8: Proportionality

- Ratios and proportionality
- Proportionality: direct and inverse
- Percentages

Lesson 9: First-degree equations

- Equivalent equations
- Algorithm for solving first-degree equations
- Problem solving

Lesson 10: Plane geometry

- Basic geometric objects
- Operations with angles
- Angle classification
- Parallel lines: intersection with a secant line

Lesson 11: Triangles

- Geometric constructions
- Perpendicular bisector, angle bisector, altitude, median.
- Pythagorean theorem

Lesson 12: Polygons and circumference

- Polygons
- Squares
- Circumference
- Angles in a circumference

Lesson 13: Perimeters and areas

- Perimeter and area of a polygon.
- Length and area of a circumference and a circle

Lesson 14: Functions, tables, graphics and probability

- Rectangular coordinates
- Reading the graph of a function
- Frequency tables
- Statistical graphics
- Random experiments

Secondary education 2

Lesson 1: Divisibility and integer numbers

- Divisibility
- Greatest common divisor and least common multiple
- Operations with integers

Lesson 2: Fractions and decimal numbers

- Operations with fractions
- Operations with decimal numbers
- Fractions and decimal numbers
- Generatrix fraction

Lesson 3: Exponents and roots

- Powers with integer exponent
- Square root
- Cube root

Lesson 4: Proportionality

- Ratio and proportionality
- Percentage
- Proportional variables

- Compound proportionality

Lesson 5: Arithmetic problems

- Distribution problems
- Pipes and water tanks problems
- Mixture problems

Lesson 6: Polynomials

- Operations with monomials
- Operations with polynomials
- Binomial theorem

Lesson 7: Equations

- First-degree equations
- Second-degree equations
- Number of solutions. Factorization.
- Problem solving.

Lesson 8: Simultaneous equations

- Simultaneous equations. Graphic method
- Solving by equalization, substitution and elimination
- Problem solving

Lesson 9: Lines and hyperbolas

- Definition of function
- Linear and affine functions
- Inverse proportionality function

Lesson 10: Similarity. Thale's and pythagorean theorems.

- Similar figures
- Thale's theorem
- Pythagorean theorem

Lesson 11: Volume and geometrical shapes

- Basic shapes
- Polyhedra, prisms and cylinders
- Cones and pyramids

Lesson 12: Area and volume

- Volume measurement
- Area and volume of geometric shapes

Lesson 13: Statistics

- Table of frequencies
- Representation of discrete random variables
- Representation of continuous random variables
- Centralization measures

Lesson 14: Probability

- Random experiments

- Probability properties
- Simple and compound experiments

Secondary education 3

Lesson 1: Rational and irrational numbers

- Fractions
- Operations with fractions
- Convert decimal and fractions
- Real numbers

Lesson 2: Exponents and surds

- Powers with natural exponent.
- Powers with integer exponents
- Surds
- Properties of the powers and surds

Lesson 3: Sequences and series

- Sequences
- Arithmetic sequences
- Geometric sequences
- Simple and compound interest

Lesson 4: Proportionality

- Ratio and proportionality
- Proportional variables
- Compound proportionality
- Arithmetic problems

Lesson 5: Operations with polynomials

- Polynomials. Addition and subtraction
- Product of polynomials
- Division of polynomials
- Remainder theorem

Lesson 6: Equations

- First-degree equations
- Second-degree equations
- Number of solutions. Factorization.
- Problem solving.

Lesson 7: Simultaneous equations

- Simultaneous equations. Graphic method
- Solving by equalization, substitution and elimination
- Problem solving

Lesson 8: Properties of the functions. Affine functions

- Functions

- Properties of the functions
- Constant and linear functions
- Affine functions

Lesson 9: Parabolas and hyperbolas

- Quadratic functions
- Hyperbolas. Translations.

Lesson 10: Thale's theorem and Pythagorean theorem

- Angles
- Thale's theorem
- Pythagorean theorem
- Area of plane shapes

Lesson 11: Rigid transformations

- Vectors and translations
- Rotations.
- Axial and central symmetry

Lesson 12: Area and volume

- Volume measurement
- Area and volume of geometric shapes: cone, pyramid and sphere

Lesson 13: Statistics

- Table of frequencies
- Statistical graphics
- Measures of statistical centralization
- Measures of statistical dispersion

Lesson 14: Probability

- Random experiments
- Laplace's rule of succession
- Simple and compound experiments

Secondary education 4

Lesson 1: Real numbers

- Irrational numbers
- Intervals
- Surds
- Error and approximation
- Logarithms

Lesson 2: Operations with polynomials

- Polynomials. Operations with polynomials
- Ruffini's rule. Roots of a polynomial
- Factorization of polynomials

- Polynomial divisibility
- Algebraic fractions

Lesson 3: Equations

- Equations
- Linear simultaneous equations
- Non-linear simultaneous equations
- Inequalities

Lesson 4: Functions. Properties of the functions

- Properties of the functions
- Graph of a function
- Domain of a function
- Continuity
- Intervals of increase and decrease
- Limits
- Periodic functions

Lesson 5: Elementary functions

- Affine functions
- Quadratic functions
- Absolute value
- Hyperbolas
- Exponential and logarithmic functions

Lesson 6: Trigonometry

- Trigonometric values in a triangle
- Trigonometric identities
- Solving triangles
- Trigonometric values in the unit circle
- Radians

Lesson 7: Analytic geometry

- Vectors. Operations with vectors
- Collinear points
- Mid-point
- Equations of the line
- Relative position of two lines
- Parallel and perpendicular lines
- Distance between points

Lesson 8: Statistics

- Introduction to statistics and its methods
- Table of frequencies
- Statistical parameters: mean and mean deviation

Lesson 9: Bidimensional random variables

- Bidimensional variables
- Correlation

- Regression line

Lesson 12: Combinatorics

- Counting possibilities by means of the product
- Permutations, combinations and variations

Lesson 11: Probability

- Random experiments
- Laplace's rule of succession
- Probability in simple and compound experiments
- Independent events
- Contingency table

Bachillerato I

Part 1: Arithmetic and algebra

Real numbers

- Rational and irrational numbers. Real numbers
- Intervals
- Absolute value
- Surds
- Logarithms

Algebra

- Factorization of polynomials
- Algebraic fractions
- Second-degree equations and biquadratic equations
- Equations that involve surds
- Equations that involve algebraic fractions
- Logarithmic and exponential equations
- Simultaneous equations
- Gaussian elimination

Part II: Trigonometry and complex numbers

Triangles

- Trigonometric values in a triangle
- Trigonometric values in the unit circle
- Trigonometric identities
- Radians
- Trigonometric functions
- Trigonometric equations

Complex numbers

- The complex plane
- Operations with complex numbers
- Polar and rectangular coordinates

- Root of a complex number

Part III: Analytic geometry

Vectors

- Vectors. Operations with vectors
- Coordinates
- Dot product

Equations of the line

- Equations of the line
- Parallel and perpendicular lines
- Relative position of two lines
- Angle between lines
- Distance

Conic sections

- Circumference
- Ellipse
- Parabola
- Hyperbola
- Tangent lines to a conic

Part IV: Analysis

Elementary functions

- Definition of function
- Piecewise functions
- Absolute value of a function
- Inverse function
- Exponential and logarithmic functions

Limits and continuity

- Continuity
- Limit of a function
- Asymptotes
- Continuity of trigonometric functions

Differentiation of functions

- Increase and decrease of a function
- Derivative of a function
- Derivative rules
- Applications

Part V: Statistics and probability

Bidimensional variables

- Point clouds
- Correlation
- Regression line

Probability

- Random experiments
- Events
- Laplace's rule
- Conditional probability. Independence
- Baye's rule
- Total probability

Bachillerato II

Part I: Algebra

Simultaneous equations

- Simultaneous linear equations
- Triangular simultaneous equations
- Gauss rule

Matrices

- Definition of matrix
- Properties and operations with matrices
- Unit matrix. Inverse matrix,
- Rank of a matrix

Determinants

- Determinant of order 2 and 3
- Higher order determinants
- Rank of a matrix
- Cramer's rule
- Inverse of a matrix

Part II: Geometry

Vectors in the space

- Operations with vectors
- Vector basis
- Dot product
- Vector product

Analytic geometry in the space

- Equations of a line
- Relative positions of two lines
- Equations of a plane
- Relative positions of two planes
- Relative positions of a plane and a line
- Angles and distances between lines and planes

Part III: Analysis

Limits and continuity

- The number e
- Limits. Indeterminate forms
- Properties of the limits
- Continuous functions

Differentiation of functions

- Derivative of a function
- Derivability
- Chain rule
- Tangent line
- Increase and decrease of a function
- Curvature
- L'Hopital's rule
- Rolle's theorem
- Mean value theorem

Integration

- Primitive of a function
- Integration by parts.
- Integration by substitution
- Integration of rational functions
- Area under a curve. Definite integral.
- Barrow's rule
- Fundamental theorem of calculus