Math Grades 5 through 12

Grade 5

Content and Competencies:

Calculation with whole numbers: basic arithmetic operations, diagrams, Roman numerals, binary numbers, powers, equations

Geometric concepts and relations: perpendicular, parallel, distance, axially symmetrical figures, quadrangles, cuboid and cube

Metric units: length, mass, time, area, scale

Fractions: unit fraction, proper and improper fraction, mixed fraction, expanding, reducing, ordering, adding and subtracting

Textbook Mathe Logo 5 and Mathe Logo 5 Arbeitsheft

Grade 6

Content and Competencies:

Geometric concepts and relations: circle, drawing and measuring of angles, symmetry with respect to a point, translation

Divisibility and fractions: factor, multiple, divisibility rules, prime numbers, percentage as fraction

Fractions and decimal fractions: adding, subtracting, multiplying, dividing, rounding

Solid figures and volume: inclined crack, volume units, cuboid, cube

Collecting and analyzing data: mode, median, range, arithmetic mean

Textbook Mathe Logo 6 and Mathe Logo 6 Arbeitsheft

Grade 7

Content and Competencies:

Mapping and percentage: table, diagram, graph, direct and inverse proportion, calculation of percentage and interest

Calculus of probability: relative frequency, random experiment, Laplace Law, tree diagram, product rule, adding up rule

Integers und rational numbers: negative numbers, addition, subtraction, multiplication, division

Terms and equations: transformation of terms, expanding and factorizing, equation solving

Triangles and area: circumcircle, incircle, centroid, orthocenter, compass and straight-edge constructions, Thales' theorem, area

Textbook Lambacher Schweizer Mathematik 7 and Lambacher Schweizer Mathematik 7 Arbeitsheft

Grade 8

Content and Competencies:

Terms and fractional equations: expanding of sums, binomial theorem, factorizing, fractional equations

Square root and real numbers: powers and roots, irrational and real numbers

Pythagoras' theorem: proofs and problems

Area and solid figures: circle, prism, pyramid, cylinder, cone, sphere

Linear function: definition of functions, linear function, domain and range, zero, slope, y-intercept

Textbook Lambacher Schweizer Mathematik 8 and Lambacher Schweizer Mathematik 8 Arbeitsheft

Grade 9

Content and Competencies:

System of linear equations: substitution method, equalization method, elimination method, problems

Quadratic function and quadratic equation: definition and characteristics, vertex, vertex form, pq-formula and abc-formula

Laws of exponents:

Similarities, dilation, intercept theorems: problems

Textbook Lambacher Schweizer Mathematik 9

Grade 10

Content and Competencies:

Trigonometry: sine, cosine, tangent, determinations of triangles, sine rule, law of cosines

Functions: power functions, exponential functions, trigonometric functions

Calculus of probability: statistics, diagrams, Bernoulli experiment, tree diagram, product rule, adding up rule, expected value, standard deviation, fourfold table

Vector analysis: vector, arithmetic laws, equation of a line, relationships between two lines

Rate of change and derivative: instantaneous and mean rate of change, difference quotient, zeros, monotonicity, turning points

Textbook Lambacher Schweizer Mathematik 10 (Ausgabe Thüringen) and Lambacher Schweizer Mathematik 6 (Ausgabe Baden Württemberg)

Grade 11

Content and Competencies:

Derivative: definition, rule of derivation, chain rule, product rule, higher derivatives, turning points, point of inflection, optimization problems

Polynomial functions: symmetry, end behavior, zeros, turning points, points of inflection, tangents
determination of polynomial functions
family of curves

Integral calculus: definition, rule of integration, fundamental theorem of calculus, area, volume of revolution

Vector analysis: linearly dependent, linearly independent, magnitude, scalar product, cross product, equation of a line, equation of a plane, relationships, angles, distances

Textbook Lambacher Schweizer and
Mathematik für Gymnasien Gesamtband Qualifikationsphase mit CAS

Grade 12

Content and Competencies:

Calculus of probability I: combinatorics, product rule, Bayes' theorem, probability distribution, expected value, variance, standard deviation, binomial distribution

Exponential functions: Euler's number e, asymptotes, curve sketching, integral, area, improper integral

Rationale functions: vertical and oblique asymptotes, quotient rule, curve sketching, integral, area, improper integral

Calculus of probability II: probability of error, hypothesis test, confidence interval, normal distribution

Textbook Lambacher Schweizer and
Mathematik für Gymnasien Gesamtband Qualifikationsphase mit CAS