Algebra
→ algebraic (*adj.*)

Algebraic expression
Algebraic structure
- set + operation(s) => set operations
  - addition → additive (*adj.*), e.g. additive commutativity
  - multiplication → multiplicative (*adj.*), e.g. multiplicative associativity
  - binary operation
- with one operation
  - group
    - Abelian
- with two operations
  - ring
    - integral domain
  - field
    - skew f. = division algebra
- properties (conditions)
  - closure → closed under addition/multiplication/…
  - commutativity → commutative (*adj.*) × noncommutative (*adj.*)
  - associativity → associative (*adj.*)
  - distributivity → distributive (*adj.*)
    - left
    - right
  - identity property → identity element
    - = neutral element = additive identity = zero
    - = unit element = multiplicative identity = unity/one
  - inverse property → inverse (*n.*) = reciprocal element

Basis – *plural*: bases /ˈbeɪsiːz/ = "beisíz"
Cramer's rule
Determinant
Dimension → dimensional (*adj.*)
- finite dimensional × infinite dimensional
- *n*-dimensional

Elementary row/column operations
Eigenvalue = characteristic value
Equation
- linear / quadratic / cubic / quartic / quintic / of degree *n*
- binomial
- system of equations

Gaussian elimination algorithm
Kernel = null space
Linear dependence → linearly dependent (*adj.*)
× linear independence → linearly independent (*adj.*)
Linear combination
Mapping
- bijective (*adj.*) m. → bijection (*n.*)
  - surjective m. (*adj.*) → surjection (*n.*) = onto mapping – "maps set A onto set B"
  - injective m. (*adj.*) = injection (*n.*) – "maps set A into set B"
- linear m.

- image of (an element) under a mapping

Matrix, *plural*: matrices
- *m* by *n* m.
  - square
  - rectangular
- has
  - *m* rows and *n* columns
  - (main) diagonal
  - (*i*,*j*) entry / element
- transposed → transpose (*v.*, *n.*) – “A transpose” or “the transpose of A”
  - conjugate transpose = adjoint m.
- inverse → invertible m. – “A inverse” or “the inverse of A”
  - invertible = non-singular × singular
- in a echelon form – row-echelon form / column-echelon form
- upper-/lower- triangular
- identity m.

Pivot

Polynomial
- in x (= the variable is x)
- with coefficients
- Monomial / Binomial / Trinomial
- of degree *n*
- term of a p.
  - linear term = constant term
- reducible × irreducible p.
- root of a polynomial
- solvable by radicals

Product
- dot p. = scalar p. = inner p.
- cross p. = vector p.

Rank

Scalar

Span = hull

Term
- absolute = constant

Variable /ˈveəriəbl/

Vector

Vector space
- vector subspace

Mathematical Analysis – vocabulary list

analysis
- real
- complex

asymptote
- Horizontal
- Vertical
- Oblique = inclined

Calculus
- Fundamental Theorem of Calculus
- Differential c.
- Integral c.

codomain

continuity (X discontinuity → point of discontinuity; discontinuous at a point)
- at a point
- from the left
- from the right
- on an interval
- → continuous (*adj.*)

Coordinate system → coordinates
- Cartesian
- Polar
- x-coordinate
- y-coordinate

Derivative (*n.*)
- of a function
- first; second
- of higher order
- of order n
- partial (– mixed partial)
- one-sided
- left d. = left-hand
- right d. = right-hand derivative

differentiate (*v.*) → differentiation (*n.*)
- → differential (*adj.*)
- → differentiable (*adj.*) → differentiability (*n.*)

Domain

Function
- of more variables (= multivariate f.)
- of one variable (= univariate f.)
- inverse
- one-to-one (*in Czech*: ‘prostá’)
- real = real-valued
- complex = complex-valued

- course of a f.

properties

- concavity of a f.
  - concave up (also sometimes convex)
  - concave down (also sometimes concave)
- odd
- even
- periodical
- (strictly) monotonic → monotonicity (*n.*) (→ interval of monotony)
- (strictly) decreasing
- (strictly) increasing
- Non-decreasing
- Non-increasing
- Differentiable
- unbounded function
- Bounded from above = f. has an upper bound
- Bounded from below = f. has a lower bound
  - → boundedness (*n.*) of a function

extremum (→ maximum / minimum) (plural: extrema, maxima, minima)

- Global
- Local

graph

image (of *x* under *f*)

integrate (*v.*)

- → integration (*n.*)
  - by parts
  - constant of integration
  - with respect to a variable (e.g. with respect to *x*)
- → integral (*n.*)
  - Definite
    - upper limit of the i.
    - lower limit of the i.
    - "the integral from *a* to *b* of *f* of *x* with respect to *x* (= d x)"
  - indefinite i. (= anti-derivative (*n.*) = primitive (*n.*))
- → integral (*adj.*)
- Integrable (*adj.*)
  - function

inflection (point) = point of inflection (= inflexion *esp. in Br.E.)*

integrand

intercept

- x-intercept
- y-intercept

limit

- at a point
- proper

- improper = infinite
- left-hand = l. on the left
- right-hand = l. on the right
- “the limit of *f* of *x* as *x* tends to (= approaches = goes to) infinity”

mapping
- one-to-one
- identity
- bijection
    - injection
    - surjection

neighbourhood of a point
range of values = range of a function
stationary point = critical point
- inflection point
- maximum
- minimum

Number Theory, Arithmetic

absolute value
arithmetic
arithmetic mean = arithmetic average
axis – axial (*adj*.)
- real
- imaginary

commensurable
→ commensurability (*n*.)
complex conjugate
decimal
- repeating d. = recurring d.
- × non-repeating
- terminating × non-terminating

decimal expansion
decimal number
decimal place
decimal point
digit = cipher
equality
×inequality
- strict i.
- less than (or equal to)
- greater than (or equal to)

equivalence
- properties
  - reflexive
  - symmetric
  - transitive

factorization (*n*.) – factorize (*v*.) – factor (*v*.)
- prime factorization – to factor a number into primes
- unique factorization theorem

fraction
- consists of
  - Numerator
  - Denominator
- "a over b"
- in its lowest terms
- compound f.
- continued f.
- proper × improper
- → fractional (adj.)
  - fractional bar
- simplify a f. = cancel a f. (into its lowest terms)

geometric mean = geometric average
harmonic mean = harmonic value
imaginary unit
integer part
interval
- open
- closed
- half-open
  - closed from the left
  - closed from the right

number
- natural
- integral → integer (*n.*, also used as an *adj.*)
- rational
- irrational
- real
- complex
  - in algebraic form
  - in trigonometric form
  - in exponential form
- (purely) imaginary
- positive × negative
- → non-negative, non-zero
- odd × even
- prime (also *n.*)×composite
- algebraic × transcendental
- cardinal
- ordinal

number line
number set
number system
- representation in a n.s.
- binary
- decimal = base 10
- hexadecimal

operation
- arithmetic
- common arithmetic operations = fundamental operations of arithmetic
  - addition – add (*v.*) – additive (*adj.*)
    - Summand + summand = sum
  - subtraction – subtract (*v.*)
    - minuend – subtrahend = difference
  - multiplication – multiply (*v.*) – multiplicative (*adj.*)
    - Factor * factor = product
    - (least) common multiple
  - Division – divide (*v.*)
    - Dividend ÷ divisor = quotient
    - with remainder
    - → divisibility – divisible (*adj.*) × indivisible (*adj.*)
    - (greatest) common divisor = (greatest/highest) common factor
- equivalent × non-equivalent
- properties of o.
  - associativity – associative (*adj.*)
  - commutativity – commutative (*adj.*) – commute (*v.*)
    × noncommutative
  - distributivity – distributive (*adj.*)
  - identity element
  - inverse element

place value system - positional notation
power → raise to a power
prime = prime number
- → primality (*n.*)

ratio
reciprocal value
root → extract/take a root
sieve

Combinatorics, Probability, Statistics

Binomial theorem
Binomial coefficient
  – "n choose k"
Box plot
Coin flipping = coin tossing
Combination
  – with repetition
Conditional probability
Critical value (in a hypothesis test)
Cumulative Probability Distribution Function
Discrete probability
Distribution
  – normal
  – binomial
Distributive function
Expected value
Experiment
Event
  - dependent
  - independent
  - certain → certainty (*n.*)
  - impossible → impossibility (*n.*)
  - disjoint events = mutually exclusive events
Factorial
Frequency
Hypothesis testing
  – null hypothesis
  – alternative hypothesis
  – p-value
  – significance level
Mean = arithmetic mean (*less precisely* average)
Median
Mode
Outcome
  - possible
  - favourable
  - equally likely
Outlier
Parameter
Permutation
Population
Probability distribution
Probability density function
Quartile
  – upper / lower quartile

- inter-quartile range

Quantile

Random variable

r-arrangement (sometimes called ‘variation’)

Sample space = event space

Sample (*n.*, *v.*) → sampling

- random sample

Standard deviation

Variable

- random
- continuous × discrete
- quantitative
- ordinal
- qualitative
- dependent × independent

Variance

Geometry

Abscissa
Adjacent × non-adjacent
Altitude
Angle
- acute × obtuse × straight × reflex × complete = full
- Interior × exterior
- arm of an a.
- vertex of an a.
- central a.
- measure of an a.
    - degree (minute, second)
    - radian

Angles
- adjacent
- alternate
- corresponding
- (vertically) opposite
- complementary → complement of an angle
- supplementary → supplement of an angle

Apex
Arc of a Circle
Area
Axis – axes (*pl.*)
- of reflection/ rotation / symmetry

Base
- of a(n) (isosceles) triangle
- of a trapezoid

of a solid figure (e.g. prism, cylinder, cone) × lateral surface/face
Bisect → bisector (*n.*)
- angle bisector

Cartesian coordinates
Cartesian form
Cartesian plane
Centres of a triangle
- centroid (*note*: also in general = centre of gravity/mass)
- orthocentre
- circumcentre
- incentre

Cevian
Chord
Circle → circular (*adj.*)
Circumcircle = circumscribed circle
→ circumscribe (*v.*) → circumscribable (*adj.*)
Circumference
Coincident
Collinear × Noncollinear
Concave geometric figure = non-convex

Concentric
Concurrent
Cone → conical (*adj.*)
- circular c.

Congruence
- c. tests for triangles
- → congruent (*adj.*)

Convex geometric figure
Coordinate plane
Coplanar
Cube
Cuboid
Cylinder → cylindrical (*adj.*)
- circular c.

Degenerate
Diameter
Distance
Double Cone
Edge
Equidistant
Face
Frustum of a cone or pyramid
Geometric Figure
- plane figure
- solid figure

Geometry
- analytic
- synthetic
- plane
- solid
- Euclidean × non-Euclidean
- Elliptic = Riemannian
- Hyperbolic
- Projective

Golden Ratio
Height
Horizontal
Hypotenuse
Ideal elements
Incident → incidence (*n.*)
Incircle = inscribed circle
→ inscribe (*v.*)
Invariant
Isometry
Isosceles Trapezoid
Kite
Law of Cosines
Law of Sines

Leg
- of an isosceles/right triangle / trapezoid

Line
- parallel lines
- skew lines

Line Segment
Locus
Magnitude
Median
Midpoint
Oblique
- o. cone, cylinder, prism, pyramid…

Octants
Ordered Pair
Ordered Triple
Ordinate
Origin
Parallel Postulate
Parallelepiped
Parallelogram
Pencil
Perimeter
Perpendicular (*n.*) → perpendicular (*adj.*) to sth.
Plane
Platonic Solids
Point
Polygon (= *n*-gon)
- Regular ×irregular
- Pentagon, hexagon, …

Polyhedron – polyhedra (*pl.*)
- Regular ×irregular
- Tetrahedron, hexahedron, octahedron, dodecahedron…

Prism
Pyramid
Pythagorean Identities
Pythagorean Theorem
Pythagorean Triple
Quadrants
Quadrics
Quadrilateral
Radius
Ray
Rectangle
Rectangular Coordinates
Regular
- plane figure, e.g. hexagon
- solid, e.g. polyhedra, pyramid, prism

Rhombus

Right figure (e.g. prism, cylinder, pyramid…)
Secant line
Sector of a circle
Segment of a circle
Self-Similarity
Semicircle
Similarity → similar (*adj*.)
- s. tests for triangles

Slant height
Slope of a line
Sphere
Square
Surface
Symmetric
Tangent line – tangent (*adj*.) to
Torus
Transformations
- translation
- rotation
- reflection
    - glide reflection
- dilation
- compression = contraction
- pre-image of a transformation
- image of a transformation

Transversal
Trapezium
Trapezoid
Triangle
- scalene × isosceles × equilateral
- obtuse × acute × right

Triangle Congruence Tests
Triangle Inequality
Trigonometric Functions
- Sine × arcsine = inverse sine
- Cosine × arccosine = inverse cosine
- Tangent × arctangent = inverse tangent
- Cotangent × arccotangent = inverse cotangent

Trigonometry
Truncated
- Cone or Pyramid
- Cylinder or prism

Unit Circle
Vertex – vertices (*pl.*)
Vertical
Volume

Graph Theory – Vocabulary List

adjacency matrix = connection matrix
approximate (*v.*, *adj.*)
- → approximation (*n.*) (of sth.)

bridge (= graph bridge)
centre of a graph
clique
colouring (= coloring *AmE*)
- edge c. → edge-coloured graph
- vertex c. → vertex-coloured graph
- chromatic number
- achromatic number

cut
cycle
- graph c.
- Hamiltonian c.
- Eulerian/Euler = E. circuit = E. tour

edge = arc (= line)
- directed
- separating
- subdivision of an edge
- edge set

endpoint
forest
graph
- simple g. × multigraph
- pseudograph
- directed → directedness (*n.*)
  × undirected
- oriented
  × non-oriented
- labelled (= labeled *AmE*)
  - edge-labelled
  - vertex-labelled
- connected
  × disconnected
  - k-connected g.
  - edge-connectivity
  - vertex-connectivity
  - totally disconnected = edgeless
- cyclic
  × acyclic
- k-partite graph
  - e.g. bipartite gr.
- complete g. → completeness (*n.*)
- planar
  × non-planar
- finite
  × infinite
- n-regular g.
- uniform g.

- homeomorphic graphs
- homomorphic graphs
- isomorphic graphs
- Eulerian g.
- graph order = order of a graph
- size of a g.
- null g. = empty g.

graph component
- strongly connected

incident (*adj*.)
- an edge is incident to its endpoints

intersection
- of graphs
- graph

in-degree

loop
- simple

matching

maximal subgraph for a particular property × minimal

maximum subgraph for a particular property

neighbour

subgraph

out-degree

path
- = Hamiltonian walk
- closed p. = cycle
- Hamiltonian path = H. line
- Eulerian p. = Euler walk = Euler chain = Euler trail = E. line

problem
- transport p.
- travelling-salesman p.
- four colour problem

simplex

spanning (*adj*.)
- subgraph
- tree
    - minimal spanning tree

trail
- closed = circuit

tree

vertex = node (= point)
- of a graph
- adjacent vertices
- even
- odd
- degree = the degree of a graph vertex
- articulation v. = cut-vertex = cutpoint
- terminal v.
- isolated

walk
- oriented

Set theory and Logic

Axiom → axiomatic (*adj*.)
Cartesian product
Cardinal numbers
- → cardinality of a set

Completeness
Consistency
Condition
- necessary c. – P ⇒ S "S is a necessary condition for P"
- sufficient c. – P ⇒ S "P is a sufficient condition for S"

Counterexample
DeMorgan's laws
Difference
Element
- $a \in S$: "*a* is an element of *S*", "*a* belongs to *S*", "*a* lies in *S*"

Intersection
- "the intersection of *A* and *B*", "*A* intersect *B*"

Union
- "the union of *A* and *B*", "*A* union *B*"

Complementation
- → complement (of *S* with respect to (/in) *U*)

Ordinal numbers
Quantifier
- existential
  - ∃! "there exists/is one and only one" "there exists/is exactly one"
- universal

Proof
- formal p.
- direct p.
- indirect p. = by contradiction
- by cases
- by induction **on** *n* (*in Czech* 'indukce **podle** *n*')

Proposition
Tautology
Theorem
Truth functional connective
- Boolean connective
  - conjunction – "and"
  - disjunction – "or"
  - negation – "not"
- (material) conditional = *if* ... *then* ... statement = implication
- biconditional = *if and only if* statement = equivalence

Truth table
Truth value
Set
- null = empty
- universal = universe of discourse = domain of discourse
- finite /faɪnaɪt/ × infinite /ɪnfɪnət/

Subset
- proper
- improper