

VCE Mathematical Methods 3/4 Curriculum and Khan Academy Links

Functions and relations

Set notation and sets of numbers
Identifying and describing relations and functions
Types of functions and implied domains
Sums and products of functions
Composite functions
Inverse functions
Power functions

<https://www.khanacademy.org/math/algebra2/manipulating-functions>

Coordinate geometry and matrices

Linear equations
Linear literal equations and simultaneous linear literal equations
Linear coordinate geometry
Applications of linear functions
Matrices
The geometry of simultaneous linear equations with two variables
Simultaneous linear equations with more than two variables

<https://www.khanacademy.org/math/precalculus/precalc-matrices>

Transformations

Translations
Dilations
Reflections
Combinations of transformations
Determining transformations
Using transformations to sketch graphs
Transformations of power functions with positive integer index
Determining the rule for a function from its graph
Using matrices for transformations
Using the inverse of a 2×2 matrix for transformations

<https://www.khanacademy.org/math/algebra2/manipulating-functions>

Polynomial functions

Quadratic functions
Determining the rule for a parabola
The language of polynomials
Division and factorisation of polynomials
The general cubic function
Polynomials of higher degree
Determining the rule for the graph of a polynomial
Solution of literal equations and systems of equations

<https://www.khanacademy.org/math/algebra-basics/alg-basics-quadratics-and-polynomials>

Exponential and logarithmic functions 209

Exponential functions
The exponential function $f(x) = e^x$
Exponential equations
Logarithms
Graphing logarithmic functions
Determining rules for graphs of exponential and logarithmic functions
Solution of exponential equations using logarithms
Inverses
Exponential growth and decay

<https://www.khanacademy.org/math/algebra/introduction-to-exponential-functions>

Circular functions

Measuring angles in degrees and radians
Defining circular functions: sine, cosine and tangent
Further symmetry properties and the Pythagorean identity
Graphs of sine and cosine
Solution of trigonometric equations
Sketch graphs of $y = a \sin n(t \pm \varepsilon)$ and $y = a \cos n(t \pm \varepsilon)$
Sketch graphs of $y = a \sin n(t \pm \varepsilon) \pm b$ and $y = a \cos n(t \pm \varepsilon) \pm b$
Addition of ordinates for circular functions
Determining rules for graphs of circular functions
The tangent function
General solution of trigonometric equations
Applications of circular functions

<https://www.khanacademy.org/math/engageny-alg2/alg2-2>

Further functions

More power functions
Composite and inverse functions
Sums and products of functions and addition of ordinates
Function notation and identities
Families of functions and solving literal equations

<https://www.khanacademy.org/math/algebra2/manipulating-functions>

Differentiation

The derivative
Rules for differentiation
Differentiating x^n where n is a negative integer
The graph of the derivative function
The chain rule
Differentiating rational powers
Differentiation of e^x
Differentiation of the natural logarithm function
Derivatives of circular functions
The product rule
The quotient rule
Limits and continuity
When is a function differentiable?

<https://www.khanacademy.org/math/differential-calculus>

Applications of differentiation

Tangents and normals
Rates of change
Stationary points
Types of stationary points
Absolute maximum and minimum values
Maximum and minimum problems
Families of functions

<https://www.khanacademy.org/math/calculus-1>

Integration

The area under a graph
Antidifferentiation: indefinite integrals
The antiderivative of $(ax + b)^n$
The antiderivative of e^{ax}
The fundamental theorem of calculus and the definite integral
Finding the area under a curve
Integration of circular functions
The area of a region between two curves
Applications of integration
The fundamental theorem of calculus

<https://www.khanacademy.org/math/calculus-2/cs2-integrals-review>

Discrete random variables and their probability distributions

Sample spaces and probability

Conditional probability and independence

Discrete random variables

Expected value (mean), variance and standard deviation

<https://www.khanacademy.org/math/statistics-probability/random-variables-stats-library#random-variables-discrete>

The binomial distribution

Bernoulli sequences and the binomial probability distribution

The graph, expectation and variance of a binomial distribution

Finding the sample size

Proofs for the expectation and variance

<https://www.khanacademy.org/math/probability/binomial-probability-a2>

Continuous random variables and their probability distributions

Continuous random variables

Mean and median for a continuous random variable

Measures of spread

Properties of mean and variance

Cumulative distribution functions

<https://www.khanacademy.org/math/ap-statistics/random-variables-ap#continuous-random-variables>

The normal distribution

The normal distribution

Standardisation and the 68–95–99.7% rule

Determining normal probabilities

Solving problems using the normal distribution

The normal approximation to the binomial distribution

<https://www.khanacademy.org/math/statistics-probability/modeling-distributions-of-data>

Sampling and estimation

Populations and samples

The exact distribution of the sample proportion

Approximating the distribution of the sample proportion

Confidence intervals for the population proportion

<https://www.khanacademy.org/math/statistics-probability/confidence-intervals-one-sample>