



# Alberta Education 7-9 Mathematics Program of Studies Overview

Adapted from My Child's Learning: A Parent Resource

## Grade 7

**Learning about statistics.** Your child will learn and explain the divisibility rules, solve problems involving percent, and add and subtract integers. They will add and subtract fractions and mixed numbers. Your child will model and solve one- and two-step equations, and solve problems involving area. They will understand the mean, median and mode for a set of data and create and interpret circle graphs. Students will:

- compare and order positive fractions, decimals and whole numbers
- add, subtract, multiply and divide decimals and use percent to solve problems
- understand the relationship between fractions and decimals, including repeating decimals
- add and subtract fractions and integers
- use tables, graphs, equations and words to describe number patterns
- work with expressions and equations to solve problems
- understand the relationship between radius, diameter and circumference in a circle
- develop and apply formulas for the area of triangles, parallelograms and circles
- perform geometric constructions for lines and angles
- plot points in all four quadrants of a grid
- perform reflections, rotations and slides of 2-D shapes in all four quadrants
- express probabilities as ratios, fractions and percents

## Grade 8

**Understanding ratios, rates and proportions.** Your teen will understand perfect squares and square roots, and solve problems involving percents, rates, ratios and proportions. They will multiply and divide positive fractions, mixed numbers and integers. Your teen will solve problems involving the Pythagorean theorem, surface area, volume and probability of independent events. Students will:

- estimate square roots of numbers
- solve problems involving percents greater than or equal to 0%
- express percents as fractions and decimals
- solve linear equations
- use tables, graphs, equations and words to describe number patterns
- represent 3-D objects as nets and in different views
- determine the surface area of rectangular prisms, triangular prisms and cylinders
- develop and apply formulas for the volume of rectangular prisms, triangular prisms and cylinders
- understand congruency of polygons
- interpret graphs critically

## Grade 9

**Working with powers and polynomials.** Your teen will solve problems involving powers and apply the order of operations, including exponents. They will solve problems involving operations on positive and negative fractions and decimals, and understand square roots of positive numbers. Students will:

- understand powers with integral bases and whole number exponents
- compare and order fractions and decimals
- add, subtract, multiply and divide positive and negative fractions and decimals
- determine square roots of positive rational numbers that are perfect squares
- estimate square roots of positive numbers that are non-perfect squares
- interpolate or extrapolate from the graph of a linear relation to solve problems
- add and subtract polynomials
- multiply and divide a polynomial by a monomial
- solve problems involving surface area of composite 3-D objects
- understand similarity of polygons
- understand line and rotation symmetry
- understand data collection techniques and biases



# Alberta Education 10-12 Mathematics Program of Studies Overview

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## Mathematics 10C

Mathematics 10C students determine the surface area and volume of 3-D objects and use trigonometric ratios to solve problems involving right triangles. They simplify expressions that involve powers with integral and rational exponents and simplify or factor polynomial expressions. At this level, students also analyze linear relations, solve systems of linear equations and solve problems related to both of these sets of skills.

## Mathematics 20-1

Mathematics 20-1 students investigate arithmetic and geometric patterns and use the sine and cosine laws to solve problems involving triangles. They investigate the properties of radicals and rational expressions. Mathematics 20-1 students also analyze the characteristics of absolute value functions and quadratic functions, solve quadratic equations and systems of equations in various ways, and analyze the relationship between a function and its reciprocal.

## Mathematics 30-1

Mathematics 30-1 students investigate the properties of logarithms; study the characteristics and transformations of trigonometric, polynomial, exponential and logarithmic functions by sketching and analyzing their graphs; and solve equations and problems related to these functions. Students also use basic counting principles to determine the number of permutations or combinations of the elements of a set to solve problems.

## Mathematics 31

Mathematics 31 students determine the limit of a function at finite or infinite values of the independent variable. They use derivative theorems to determine the derivative of a function, either explicitly or implicitly, and use derivatives to sketch graphs of functions and solve optimization problems. They also investigate the relationship between differentiation and integration.

## Mathematics 20-2

Mathematics 20-2 students use proportional reasoning to solve real-life problems involving 2-D shapes and 3-D objects. They use the properties of angles and triangles, including the sine and cosine laws, to solve problems; use reasoning to prove conjectures; use spatial reasoning to solve puzzles; and solve problems that involve radicals. They interpret statistical data, solve problems involving quadratics and research and present a mathematical topic of their choice.

## Mathematics 30-2

Mathematics 30-2 students use numerical and logical reasoning to solve puzzles, and solve real-life problems about the probability of events occurring. They solve problems algebraically involving rational equations; investigate exponential, logarithmic, polynomial and sinusoidal functions; and research and present a mathematical topic of their choice.

## Mathematics 10-3

Mathematics 10-3 students solve linear and area measurement problems of 2-D shapes and 3-D objects using SI and imperial units. They use spatial reasoning to solve puzzles; solve problems involving right triangles and angles; solve unit pricing, currency exchange and income problems; and manipulate formulas to solve problems. They also use scale factors and parallel and perpendicular lines to solve problems.

## Mathematics 20-3

Mathematics 20-3 students solve surface area, volume and capacity problems. They use primary trigonometry to solve problems involving two or three right triangles, and model and draw 3-D objects and their views to scale. They use numerical reasoning to solve puzzles; create and analyze personal budgets; use proportional reasoning, unit analysis and manipulation of formulas to solve problems; and create and interpret graphs. Students use their understanding of slope and rate of change to interpret graphs.

## Mathematics 30-3

Mathematics 30-3 students investigate the limitations of measuring instruments, use trigonometry to solve problems involving triangles, and describe and illustrate properties of polygons. They investigate slides, rotations, flips and size changes of 2-D shapes or 3-D objects; they use logical reasoning to solve puzzles; and they solve various other problems involving financial situations, linear relations and probability.

## Mathematics 10-4

Knowledge and Employability Mathematics 10-4 students solve everyday problems involving numbers and percents; explore patterns, variables, expressions and equations to solve problems; and solve problems involving estimation, measurement and comparison of objects. Students use visualization and symmetry to explore objects, shapes, patterns and designs; develop and apply a plan to collect, display and analyze data and information; and connect mathematical ideas to their everyday lives. Students who have experienced challenges or difficulty with their skills will be provided with additional strategies for success in the Knowledge and Employability -4 course sequence.

## Mathematics 20-4

Knowledge and Employability Mathematics 20-4 students solve everyday problems involving numbers and percents, and decide if the processes used are reasonable. They explore patterns, variables and expressions, and interpret variables, equations and relationships, to solve problems in practical situations. They estimate, measure and compare objects; read and interpret scale drawings and maps; develop and apply a plan to collect, display and analyze information; and use probability and statistics to make predictions and decisions. In most of their studies, Mathematics 20-4 students connect mathematical ideas to their everyday lives. Students who have experienced challenges or difficulty with their skills will be provided with additional strategies for success in the Knowledge and Employability -4 course sequence.