Mathematics 9

General Curriculum Outcomes

A. Students will demonstrate number sense and apply number-theory concepts.
B. Students will demonstrate operation sense and apply operation principles and procedures in both numeric and algebraic situations.
C. Students will explore, recognize, represent, and apply patterns and relationships, both informally and informally.
D. Students will demonstrate an understanding of and apply concepts and skills associated with measurement.
E. Students will demonstrate spatial sense and apply geometric concepts, properties, and relationships.
F. Students will solve problems involving the collection, display, and analysis of data.
G. Students will represent and solve problems involving uncertainty.

Specific Curriculum Outcomes

Students will be expected to

A1 investigate problems involving square root and principal square root
A2 graph and write in symbols and in words the solution set for equations and inequations involving integers and other real numbers
A3 demonstrate an understanding of the meaning and uses of irrational numbers
A4 interrelate subsets of the set of real numbers
A5 compare and order real numbers
A6 represent problem situations using matrices

B1 model, solve, and create problems involving real numbers
B2 add, subtract, multiply, and divide rational numbers in fractional and decimal forms using the most appropriate methods
B3 apply the order of operations in rational number computations
B4 demonstrate an understanding of and apply the exponent laws for integral exponents
B5 model, solve, and create problems involving numbers expressed in scientific notation
B6 judge the reasonableness of results in problem situations involving square roots, rational numbers, and numbers written in scientific notation
B7 model, solve, and create problems involving the matrix operations of addition, subtraction, and scalar multiplication
B8 add and subtract polynomial expressions symbolically to solve problems
B9 find products of two monomials, a monomial and a polynomial, and two binomials concretely, pictorially, and symbolically
B10 find quotients of polynomials with monomial divisors
B11 evaluate polynomial expressions
B12 factor algebraic expressions with common monomial factors concretely, pictorially, and symbolically

B13 demonstrate an understanding of the applicability of commutative, associative, distributive, identity, and inverse properties to operations involving algebraic expressions
B14 select and use appropriate strategies in problem situations

C1 represent patterns and relationships in a variety of formats and use these representations to predict and justify unknown values
C2 interpret graphs that represent linear and non-linear data
C3 construct and analyze tables and graphs to describe how changes in one quantity affect a related quantity
C4 determine the equations of lines by obtaining their slopes and *y*-intercepts from graphs and sketch graphs of equations using *y*-intercepts and slopes
C5 explain the connections among different representations of patterns and relationships
C6 solve single-variable equations algebraically and verify the solutions
C7 solve first-degree single-variable inequalities algebraically, verify the solutions, and display them on number lines
C8 solve and create problems involving linear equations and inequalities

D1 apply rates, other ratios, and proportions in indirect measurement problems with particular focus on slopes
D2 solve measurement problems involving conversion among SI units
D3 relate the volumes of pyramids and cones to the volumes of corresponding prisms and cylinders
D4 estimate, measure, and calculate volumes and surface areas of pyramids, cones, and spheres and apply these measures
D5 demonstrate understanding of and apply ratios within similar triangles

E1 interpret, represent, and apply mapping notations for transformations on the co-ordinate plane
E2 make and apply informal deductions about the minimum sufficient conditions to guarantee a translation, a reflection, and a 180-degree rotation
E3 make and apply informal deductions about the minimum sufficient conditions to guarantee the similarity of two triangles
E4 make and apply generalizations about the properties of Platonic Solids
E5 solve problems involving 3-D shapes using visualization, reasoning, and geometric modelling
E6 recognize, name, describe, and represent arcs, chords, tangents, central angles, inscribed angles and circumscribed angles, and make generalizations about their relationships in circles

F1 determine the strength of the relationships in scatter plots
F2 sketch lines of best fit and determine their equations
F3 sketch curves of best fit for relationships that appear to be non-linear
F4 select, defend, and use the most appropriate methods for displaying data
F5 draw inferences and make predictions based on data analysis and data displays
F6 demonstrate an understanding of the role of data management in society
F7 evaluate arguments and interpretations that are based on data analysis

G1 make predictions of, and conduct experiments and simulations to determine, probabilities involving dependent and independent events
G2 determine theoretical probabilities of compound events
G3 compare experimental and theoretical probabilities
G4 recognize and explain why decisions based on probabilities may be combinations of theoretical calculations, experimental results, and subjective judgments