Number

General Outcome

Develop number sense.

9.N.1. Demonstrate an understanding of powers with integral bases (excluding base 0) and whole number exponents by
- representing repeated multiplication using powers
- using patterns to show that a power with an exponent of zero is equal to one
- solving problems involving powers

[C, CN, ME, PS, R]

9.N.2. Demonstrate an understanding of operations on powers with integral bases (excluding base 0) and whole number exponents.
[C, CN, ME, PS, R, T]

9.N.3. Demonstrate an understanding of rational numbers by
- comparing and ordering rational numbers
- solving problems that involve arithmetic operations on rational numbers

[C, CN, ME, PS, R, T, V]

9.N.4. Explain and apply the order of operations, including exponents, with and without technology.
[ME, PS, T]

9.N.5. Determine the square root of positive rational numbers that are perfect squares.
[C, CN, ME, PS, R, T]

9.N.6. Determine the approximate square root of positive rational numbers that are non-perfect squares.
[C, CN, ME, PS, R, T]

Patterns and Relations

General Outcome

Use patterns to describe the world and solve problems.

9.PR.1. Generalize a pattern arising from a problem-solving context using linear equations and verify by substitution.
[C, CN, PS, R, V]

9.PR.2. Graph linear relations, analyze the graph, and interpolate or extrapolate to solve problems.
[C, CN, ME, PS, R, T, V]

General Outcome

Represent algebraic expressions in multiple ways.

9.PR.3. Model and solve problems using linear equations of the form
- $ax = b$
- $ax + b = c$
- $ax = b + cx$
- $a(x + b) = c$
- $ax + b = cx + d$
- $a(bx + c) = d(ex + f)$
- $\frac{a}{x} = b,\ x \neq 0$

where a, b, c, d, e and f are rational numbers.
[C, CN, ME, PS, V]

9.PR.4. Explain and illustrate strategies to solve single variable linear inequalities with rational number coefficients within a problem-solving context.
[C, CN, ME, PS, R, V]

9.PR.5. Demonstrate an understanding of polynomials (limited to polynomials of degree less than or equal to 2).
[C, CN, R, V]

9.PR.6. Model, record, and explain the operations of addition and subtraction of polynomial expressions, concretely, pictorially, and symbolically (limited to polynomials of degree less than or equal to 2).
[C, CN, ME, PS, R, V]

9.PR. 7. Model, record, and explain the operations of multiplication and division of polynomial expressions (limited to polynomials of degree less than or equal to 2) by monomials, concretely, pictorially, and symbolically.
[C, CN, R, V]

Shape and Space

General Outcome

Use direct or indirect measurement to solve problems.

9.SS.1. Solve problems and justify the solution strategy using circle properties including
- the perpendicular from the centre of a circle to a chord bisects the chord
- the measure of the central angle is equal to twice the measure of the inscribed angle subtended on the same arc
- the inscribed angles subtended by the same arc are congruent
- a tangent to a circle is perpendicular to the radius at the point of tangency

[C, CN, PS, R, T, V]

General Outcome

Describe the characteristics of 3-D objects and 2-D shapes, and analyze the relationships among them.

9.SS.2. Determine the surface area of composite 3-D objects to solve problems.
[C, CN, ME, PS, R, V]

9.SS.3. Demonstrate an understanding of similarity of polygons.
[C, CN, PS, R, V]

General Outcome

Describe and analyze position and motion of objects and shapes.

9.SS.4. Draw and interpret scale diagrams of 2-D shapes.
[CN, R, T, V]

9.SS.5. Demonstrate an understanding of line and rotation symmetry.
[C, CN, PS, V]

Statistics and Probability

General Outcome

Collect, display, and analyze data to solve problems.

9.SP.1. Describe the effect of
- bias
- use of language
- ethics
- cost
- time and timing
- privacy
- cultural sensitivity

on the collection of data.
[C, CN, R, T]

9.SP.2. Select and defend the choice of using either a population or a sample of a population to answer a question.
[C, CN, PS, R]

9.SP.3. Develop and implement a project plan for the collection, display, and analysis of data by
- formulating a question for investigation
- choosing a data collection method that includes social considerations
- selecting a population or a sample
- collecting the data
- displaying the collected data in an appropriate manner
- drawing conclusions to answer the question

[C, PS, R, T, V]

General Outcome

Use experimental or theoretical probabilities to represent and solve problems involving uncertainty.

9.SP.4. Demonstrate an understanding of the role of probability in society.
[C, CN, R, T]

Processes:
C – Communication
CN – Connections
ME – Mental Mathematics and Estimation
PS – Problem Solving
R – Mathematical Reasoning
T – Technology
V - Visualization