**9th Grade Mathematics Syllabus**

**Numbers**

A.1 Classify numbers

A.2 Compare and order rational numbers

A.3 Number lines

A.4 Convert between decimals and fractions

A.5 Square roots

A.6 Cube roots

**Operations**

B.1 Add, subtract, multiply and divide integers

B.2 Evaluate numerical expressions involving integers

B.3 Evaluate variable expressions involving integers

B.4 Add and subtract rational numbers

B.5 Multiply and divide rational numbers

B.6 Evaluate numerical expressions involving rational numbers

B.7 Evaluate variable expressions involving rational numbers

**Ratios, rates and proportions**

C.1 Identify equivalent ratios

C.2 Write an equivalent ratio

C.3 Unit rates

C.4 Unit prices

C.5 Solve proportions

C.6 Solve proportions: word problems

C.7 Scale drawings: word problems

**Percents**

D.1 Convert between percents, fractions and decimals

D.2 Solve percent equations

D.3 Percent word problems

D.4 Percent of change

D.5 Percent of change: word problems

D.6 Percent of a number: VAT, discount and more

D.7 Find the percent: discount and mark-up

D.8 Multi-step problems with percents

**Measurement**

E.1 Convert rates and measurements

E.2 Precision

E.3 Greatest possible error

E.4 Minimum and maximum area and volume

E.5 Percent error

E.6 Percent error: area and volume

**Lines and angles**

F.1 Transversals: name angle pairs

F.2 Transversals of parallel lines: find angle measures

F.3 Identify complementary, supplementary, vertical, adjacent and congruent angles

F.4 Find measures of complementary, supplementary, vertical and adjacent angles

**Triangles**

G.1 Classify triangles

G.2 Triangle angle-sum property

G.3 Exterior angle property

G.4 Exterior angle inequality

G.5 Angle-side relationships in triangles

G.6 Triangle Inequality Theorem

G.7 Midsegments of triangles

G.8 SSS, SAS and ASA Theorems

G.9 SSS Theorem in the coordinate plane

G.10 Congruency in isosceles and equilateral triangles

G.11 Hypotenuse-Leg

**Theorem Quadrilaterals**

H.1 Classify quadrilaterals

H.2 Graph quadrilaterals

H.3 Properties of parallelograms

H.4 Proving a quadrilateral is a parallelogram

H.5 Properties of rhombuses

H.6 Properties of squares and rectangles

H.7 Properties of trapeziums

H.8 Properties of kites

H.9 Review: properties of quadrilaterals

**Polygons**

I.1 Polygon vocabulary

I.2 Interior angles of polygons

I.3 Exterior angles of polygons

I.4 Review: interior and exterior angles of polygons

**Area and perimeter**

J.1 Perimeter

J.2 Area of rectangles and squares

J.3 Area of parallelograms and triangles

J.4 Area of trapeziums

J.5 Area and circumference of circles

J.6 Area of compound figures

J.7 Area between two shapes

J.8 Area and perimeter mixed review

J.9 Heron's formula

**Surface area and volume**

K.1 Introduction to surface area and volume

K.2 Surface area of prisms and cylinders

K.3 Surface area of cones

K.4 Volume of prisms and cylinders

K.5 Volume of cones

K.6 Surface area and volume of spheres

K.7 Surface area and volume review

**Circles**

L.1 Parts of a circle

L.2 Central angles

L.3 Arc measure and arc length

L.4 Area of sectors

L.5 Circle measurements: mixed review

L.6 Arcs and chords

L.7 Tangent lines

L.8 Perimeter of polygons with an inscribed circle

L.9 Inscribed angles

L.10 Angles in inscribed right triangles

L.11 Angles in inscribed quadrilaterals

**Constructions**

M.1 Construct the midpoint or perpendicular bisector of a segment

M.2 Construct an angle bisector

M.3 Construct a congruent angle

M.4 Construct an equilateral triangle or regular hexagon

**Solve equations**

N.1 Model and solve equations using algebra tiles

N.2 Write and solve equations that represent diagrams

N.3 Solve one-step linear equations

N.4 Solve two-step linear equations

N.5 Solve advanced linear equations

N.6 Solve equations with variables on both sides

N.7 Solve equations: complete the solution

N.8 Find the number of solutions

N.9 Create equations with no solutions or infinitely many solutions

N.10 Solve linear equations: word problems

N.11 Solve linear equations: mixed review

**Data and graphs**

O.1 Interpret bar graphs, line graphs and histograms

O.2 Create bar graphs, line graphs and histograms

O.3 Interpret pie charts

O.4 Interpret stem-and-leaf plots

**Problem solving**

P.1 Word problems: mixed review

P.2 Word problems with money

P.3 Consecutive integer problems

P.4 Rate of travel: word problems

P.5 Weighted averages: word problems

**Logic**

Q.1 Identify hypotheses and conclusions

Q.2 Counterexamples

**Coordinate plane**

R.1 Coordinate plane review

R.2 Quadrants and axes

**Direct variation**

S.1 Identify proportional relationships

S.2 Find the constant of variation

S.3 Graph a proportional relationship

S.4 Write direct variation equations

S.5 Write and solve direct variation equations

**Linear equations**

T.1 Identify linear equations

T.2 Find the slope of a graph

T.3 Find the slope from two points

T.4 Find a missing coordinate using slope

T.5 Slope-intercept form: find the slope and y-intercept

T.6 Slope-intercept form: graph an equation

T.7 Slope-intercept form: write an equation from a graph

T.8 Slope-intercept form: write an equation

T.9 Slope-intercept form: write an equation from a table

T.10 Slope-intercept form: write an equation from a word problem

T.11 Linear equations: solve for y

T.12 Write linear equations to solve word problems

T.13 Compare linear equations, graphs and tables

T.14 Write equations in standard form

T.15 Standard form: find x- and y-intercepts

T.16 Standard form: graph an equation

T.17 Equations of horizontal and vertical lines

T.18 Graph a horizontal or vertical line

T.19 Slopes of parallel and perpendicular lines

T.20 Write an equation for a parallel or perpendicular line

**Exponents**

U.1 Exponents with integer bases

U.2 Exponents with decimal and fractional bases

U.3 Negative exponents

U.4 Multiplication with exponents

U.5 Division with exponents

U.6 Multiplication and division with exponents

U.7 Power rule

U.8 Evaluate expressions using properties of exponents

U.9 Identify equivalent expressions involving exponents

**Rational exponents**

V.1 Evaluate rational exponents

V.2 Multiplication with rational exponents

V.3 Division with rational exponents

V.4 Power rule with rational exponents

V.5 Simplify expressions involving rational exponents I

V.6 Simplify expressions involving rational exponents II

**Logarithms**

W.1 Convert between exponential and logarithmic form: rational bases

W.2 Evaluate logarithms

W.3 Change of base formula

W.4 Identify properties of logarithms

W.5 Product property of logarithms

W.6 Quotient property of logarithms

W.7 Power property of logarithms

W.8 Properties of logarithms: mixed review

W.9 Evaluate logarithms: mixed review

**Scientific notation**

X.1 Convert between standard and scientific notation

X.2 Compare numbers written in scientific notation

X.3 Multiply numbers written in scientific notation

X.4 Divide numbers written in scientific notation

**Monomials**

Y.1 Identify monomials

Y.2 Multiply monomials

Y.3 Divide monomials

Y.4 Multiply and divide monomials

Y.5 Powers of monomials

**Polynomials**

Z.1 Polynomial vocabulary

Z.2 Model polynomials with algebra tiles

Z.3 Add and subtract polynomials using algebra tiles

Z.4 Add and subtract polynomials

Z.5 Add polynomials to find perimeter

Z.6 Multiply a polynomial by a monomial

Z.7 Multiply two polynomials using algebra tiles

Z.8 Multiply two binomials

Z.9 Multiply two binomials: special cases

Z.10 Multiply polynomials

Z.11 Write a polynomial from its roots

Z.12 Find the roots of factorised polynomials

**Factorising**

AA.1 HCF of monomials

AA.2 Factorise out a monomial

AA.3 Factorise quadratics with leading coefficient 1

AA.4 Factorise quadratics with other leading coefficients

AA.5 Factorise quadratics: special cases

AA.6 Factorise quadratics using algebra tiles

AA.7 Factorise by grouping

AA.8 Factorise polynomials

**Quadratic equations**

BB.1 Characteristics of quadratic equations

BB.2 Complete a table: quadratic equations

BB.3 Solve a quadratic equation using square roots

BB.4 Solve a quadratic equation using the zero-product property

BB.5 Solve a quadratic equation by factorising

BB.6 Solve a quadratic equation using the quadratic formula

**Radical expressions**

CC.1 Roots of integers

CC.2 Roots of rational numbers

CC.3 Find roots using a calculator

CC.4 Nth roots

CC.5 Simplify radical expressions with variables I

CC.6 Simplify radical expressions with variables II

CC.7 Multiply radical expressions

CC.8 Divide radical expressions

CC.9 Add and subtract radical expressions

CC.10 Simplify radical expressions using the distributive property

CC.11 Simplify radical expressions using conjugates

**Rational expressions**

DD.1 Simplify complex fractions

DD.2 Simplify rational expressions

DD.3 Multiply and divide rational expressions

DD.4 Divide polynomials

DD.5 Add and subtract rational expressions

DD.6 Solve rational equations

**Probability**

EE.1 Theoretical probability

EE.2 Experimental probability

EE.3 Compound events: find the number of outcomes

EE.4 Identify independent and dependent events

EE.5 Probability of independent and dependent events

EE.6 Factorials

EE.7 Counting principle

**Statistics**

FF.1 Mean, median, mode and range

FF.2 Quartiles

FF.3 Identify biased samples

FF.4 Variance and standard deviation