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# Year 9 maths

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## Number theory

- A.1** Prime or composite
- A.2** Prime factorisation
- A.3** Highest common factor
- A.4** Lowest common multiple
- A.5** HCF and LCM: word problems
- A.6** Classify numbers

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## Integers

- B.1** Integers on number lines
- B.2** Graph integers on horizontal and vertical number lines
- B.3** Compare and order integers

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## Operations with integers

- C.1** Add and subtract integers using number lines
- C.2** Add and subtract integers using counters
- C.3** Integer addition and subtraction rules
- C.4** Add and subtract integers
- C.5** Complete addition and subtraction sentences with integers
- C.6** Add and subtract integers: word problems
- C.7** Add and subtract three or more integers
- C.8** Understand multiplying by a negative integer using a number line
- C.9** Integer multiplication and division rules
- C.10** Multiply and divide integers
- C.11** Complete multiplication and division sentences with integers
- C.12** Evaluate numerical expressions involving integers

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## Rational numbers

- D.1** Identify rational and irrational numbers
- D.2** Convert between decimals and fractions or mixed numbers
- D.3** Rational numbers on number lines
- D.4** Compare and order rational numbers using number lines
- D.5** Compare rational numbers
- D.6** Put rational numbers in order
- D.7** Compare and order rational

## Consumer maths

- K.1** Price lists
- K.2** Unit prices
- K.3** Unit prices: find the total price
- K.4** Percent of a number: VAT, discount and more
- K.5** Find the percent: discount and mark-up
- K.6** Sale prices: find the original price
- K.7** Multi-step problems with percents
- K.8** Estimate tips
- K.9** Simple interest
- K.10** Compound interest

## Units of measurement

- L.1** Convert rates and measurements: metric units
- L.2** Multi-step problems with metric unit conversions
- L.3** Metric mixed units
- L.4** Convert between square metres and hectares
- L.5** Convert square and cubic units of length
- L.6** Convert between cubic metres and litres
- L.7** Convert rates and measurements: imperial units
- L.8** Imperial mixed units
- L.9** Convert between metric and imperial units
- L.10** Precision
- L.11** Greatest possible error
- L.12** Minimum and maximum area and volume
- L.13** Percent error
- L.14** Percent error: area and volume

## Problem solving

- M.1** Multi-step word problems
- M.2** Multi-step word problems: identify reasonable answers
- M.3** Guess-and-check word problems
- M.4** Use Venn diagrams to solve problems

## Coordinate plane

- N.1** Coordinate plane review
- N.2** Quadrants and axes

## Quadratic functions

- V.1** Does  $(x, y)$  satisfy the quadratic equation?
- V.2** Characteristics of quadratic functions: graphs
- V.3** Characteristics of quadratic functions: equations
- V.4** Complete a function table: quadratic functions
- V.5** Match quadratic functions and graphs

## Two-dimensional figures

- W.1** Triangle inequality
- W.2** Find missing angles in triangles and quadrilaterals
- W.3** Exterior Angle Theorem
- W.4** Interior angles of polygons
- W.5** Identify complementary, supplementary, vertical, adjacent and congruent angles
- W.6** Find measures of complementary, supplementary, vertical and adjacent angles
- W.7** Identify alternate interior and alternate exterior angles
- W.8** Transversals of parallel lines: name angle pairs
- W.9** Transversals of parallel lines: find angle measures
- W.10** Find lengths and measures of bisected line segments and angles
- W.11** Parts of a circle

## Three-dimensional figures

- X.1** Parts of three-dimensional figures
- X.2** Nets of three-dimensional figures
- X.3** Front, side and top view
- X.4** Base plans

## Geometric measurement

- Y.1** Area of triangles and quadrilaterals
- Y.2** Area and perimeter of squares and rectangles: word problems
- Y.3** Area of compound figures with triangles
- Y.4** Circumference of circles
- Y.5** Area of circles
- Y.6** Circles: word problems
- Y.7** Semicircles: calculate area.

numbers: word problems

## Operations with rational numbers

- E.1** Add and subtract positive and negative decimals
- E.2** Add and subtract positive and negative fractions
- E.3** Add and subtract rational numbers
- E.4** Add and subtract positive rational numbers: word problems
- E.5** Apply addition and subtraction rules
- E.6** Multiply and divide positive and negative decimals
- E.7** Multiply and divide positive and negative fractions
- E.8** Multiply and divide rational numbers
- E.9** Multiply and divide positive rational numbers: word problems
- E.10** Apply multiplication and division rules
- E.11** Apply addition, subtraction, multiplication and division rules
- E.12** Add, subtract, multiply and divide rational numbers
- E.13** Evaluate numerical expressions involving rational numbers

## Indices and roots

- F.1** Understanding indices
- F.2** Evaluate indices
- F.3** Solve equations with variable indices
- F.4** Powers of ten
- F.5** Indices with negative bases
- F.6** Indices with decimal and fractional bases
- F.7** Understanding negative indices
- F.8** Evaluate negative indices
- F.9** Multiplication with indices
- F.10** Division with indices
- F.11** Multiplication and division with indices
- F.12** Power rule
- F.13** Evaluate expressions using properties of indices
- F.14** Identify equivalent expressions involving indices I
- F.15** Identify equivalent expressions involving indices II
- F.16** Square roots of perfect squares
- F.17** Positive and negative square roots
- F.18** Estimate positive and negative square roots
- F.19** Relationship between squares and square roots
- F.20** Solve equations involving squares and square roots
- F.21** Cube roots of perfect cubes
- F.22** Estimate cube roots

## Standard form

- G.1** Convert between ordinary numbers and standard form
- G.2** Standard form on calculators
- G.3** Compare numbers written in

- N.3** Follow directions on a coordinate plane
- N.4** Find the distance between two points

## Number sequences

- O.1** Identify arithmetic and geometric sequences
- O.2** Arithmetic sequences
- O.3** Geometric sequences
- O.4** Number sequences: mixed review
- O.5** Number sequences: word problems
- O.6** Evaluate variable expressions for arithmetic sequences
- O.7** Evaluate variable expressions for geometric sequences
- O.8** Write variable expressions for arithmetic sequences

## Expressions and properties

- P.1** Write variable expressions
- P.2** Write variable expressions from diagrams
- P.3** Evaluate one-variable expressions
- P.4** Evaluate multi-variable expressions
- P.5** Evaluate radical expressions
- P.6** Evaluate rational expressions
- P.7** Identify terms and coefficients
- P.8** Properties of addition and multiplication
- P.9** Add and subtract like terms
- P.10** Multiply using the distributive property: area models
- P.11** Multiply using the distributive property
- P.12** Factors of linear expressions
- P.13** Sort factors of expressions
- P.14** Write equivalent expressions using properties
- P.15** Simplify linear expressions
- P.16** Identify equivalent linear expressions
- P.17** Identify equivalent linear expressions: word problems

## One-variable equations

- Q.1** Which  $x$  satisfies an equation?
- Q.2** Write an equation from words
- Q.3** Model and solve equations using algebra tiles
- Q.4** Write and solve equations that represent diagrams
- Q.5** Properties of equality
- Q.6** Solve two-step equations
- Q.7** Solve two-step equations: word problems
- Q.8** Solve multi-step equations
- Q.9** Solve multi-step equations with fractional coefficients
- Q.10** Solve equations involving like terms
- Q.11** Solve equations with variables on both sides
- Q.12** Solve equations: mixed review
- Q.13** Solve equations: complete the

perimeter, radius and diameter

- Y.8** Quarter circles: calculate area, perimeter and radius
- Y.9** Area of compound figures with triangles, semicircles and quarter circles
- Y.10** Area between two shapes
- Y.11** Volume of prisms and cylinders
- Y.12** Volume of compound figures
- Y.13** Surface area of prisms and cylinders

## Transformations

- Z.1** Identify reflections, rotations and translations
- Z.2** Translations: graph the image
- Z.3** Translations: find the coordinates
- Z.4** Translations: write the rule
- Z.5** Reflections: graph the image
- Z.6** Reflections: find the coordinates
- Z.7** Rotations: graph the image
- Z.8** Rotations: find the coordinates
- Z.9** Reflections, rotations and translations: graph the image
- Z.10** Reflections, rotations and translations: find the coordinates
- Z.11** Dilations: graph the image
- Z.12** Dilations: find the coordinates
- Z.13** Dilations: scale factor and classification

## Congruence and similarity

- AA.1** Identify congruent figures
- AA.2** Congruence statements and corresponding parts
- AA.3** Side lengths and angle measures of congruent figures
- AA.4** Congruent triangles: SSS, SAS and ASA
- AA.5** Identify similar figures
- AA.6** Similarity ratios
- AA.7** Similarity statements
- AA.8** Side lengths and angle measures of similar figures
- AA.9** Similar figures and indirect measurement

## Triangles and trigonometry

- BB.1** Pythagoras' theorem: find the length of the hypotenuse
- BB.2** Pythagoras' theorem: find the missing leg length
- BB.3** Pythagoras' theorem: find the missing leg or hypotenuse length
- BB.4** Pythagoras' theorem: find the perimeter
- BB.5** Pythagoras' theorem: word problems
- BB.6** Converse of Pythagoras' theorem: is it a right triangle?
- BB.7** Trigonometric ratios: sin, cos and tan
- BB.8** Find trigonometric functions of special angles: sin, cos and tan
- BB.9** Find trigonometric functions using a calculator

**G.5** Compare numbers written in standard form

## Ratios, rates and proportions

- H.1** Identify equivalent ratios
- H.2** Write an equivalent ratio
- H.3** Equivalent ratios: word problems
- H.4** Compare ratios: word problems
- H.5** Unit rates
- H.6** Equivalent rates
- H.7** Compare rates: word problems
- H.8** Ratios and rates: word problems
- H.9** Scale drawings: word problems
- H.10** Scale drawings: scale factor word problems
- H.11** Do the ratios form a proportion?
- H.12** Do the ratios form a proportion: word problems
- H.13** Solve proportions
- H.14** Solve proportions: word problems

## Direct and inverse proportions

- I.1** Find the constant of proportionality from a table
- I.2** Write equations for proportional relationships from tables
- I.3** Identify proportional relationships by graphing
- I.4** Find the constant of proportionality from a graph
- I.5** Write equations for proportional relationships from graphs
- I.6** Identify proportional relationships from graphs and equations
- I.7** Identify proportional relationships from tables
- I.8** Complete a table and graph a proportional relationship
- I.9** Graph proportional relationships
- I.10** Interpret graphs of proportional relationships
- I.11** Write and solve equations for proportional relationships
- I.12** Identify direct variation and inverse variation
- I.13** Write inverse variation equations
- I.14** Write and solve inverse variation equations

## Percents

- J.1** Convert between percents, fractions and decimals
- J.2** Convert between percents, fractions and decimals: word problems
- J.3** Compare percents to fractions and decimals
- J.4** Estimate percents of numbers
- J.5** Percents of numbers and money amounts
- J.6** Percents of numbers: word problems
- J.7** Compare percents of numbers
- J.8** Find what percent one number is of another
- J.9** Find what percent one number is of another: word problems

solution

- Q.14** Rearrange multi-variable equations

## One-variable inequalities

- R.1** Solutions to inequalities
- R.2** Graph inequalities on number lines
- R.3** Write inequalities from number lines
- R.4** Write and graph inequalities: word problems
- R.5** Solve one-step inequalities
- R.6** Graph solutions to one-step inequalities
- R.7** One-step inequalities: word problems
- R.8** Solve two-step linear inequalities
- R.9** Graph solutions to two-step inequalities
- R.10** Solve multi-step inequalities
- R.11** Graph solutions to multi-step inequalities

## Functions

- S.1** Identify functions
- S.2** Identify independent and dependent variables
- S.3** Evaluate a linear function: word problems
- S.4** Rate of change
- S.5** Constant rate of change
- S.6** Identify linear and nonlinear functions
- S.7** Find values using function graphs
- S.8** Complete a table for a function graph

## Linear functions

- T.1** Does  $(x, y)$  satisfy the linear equation?
- T.2** Complete a table for a linear equation
- T.3** Complete a table and graph a linear equation
- T.4** Interpret points on the graph of a line: word problems
- T.5** Find the gradient of a graph
- T.6** Find the gradient from two points
- T.7** Find a missing coordinate using gradient
- T.8** Find the gradient and y-intercept of a linear equation
- T.9** Graph a line using gradient
- T.10** Graph an equation in  $y=mx+c$  form
- T.11** Write an equation in  $y=mx+c$  form from a gradient and y-intercept
- T.12** Write an equation in  $y=mx+c$  form from a graph
- T.13** Write an equation in  $y=mx+c$  form from a gradient and a point
- T.14** Write an equation in  $y=mx+c$  form from two points
- T.15** Write a linear equation from a table
- T.16** Write a linear equation: word problems

## Constructions

- CC.1** Construct the midpoint or perpendicular bisector of a segment
- CC.2** Construct an angle bisector
- CC.3** Construct a perpendicular line
- CC.4** Construct parallel lines
- CC.5** Construct an equilateral triangle or regular hexagon

## Data and graphs

- DD.1** Interpret tables
- DD.2** Interpret bar graphs for categorical data
- DD.3** Create bar graphs for categorical data
- DD.4** Interpret line graphs
- DD.5** Create line graphs
- DD.6** Interpret line plots
- DD.7** Create line plots
- DD.8** Interpret stem-and-leaf plots
- DD.9** Create stem-and-leaf plots
- DD.10** Interpret bar graphs for grouped data
- DD.11** Create bar graphs for grouped data
- DD.12** Create frequency charts
- DD.13** Interpret pie charts
- DD.14** Pie charts and central angles
- DD.15** Choose the best type of graph

## Statistics

- EE.1** Calculate mean, median, mode and range
- EE.2** Interpret charts to find mean, median, mode and range
- EE.3** Mean, median, mode and range: find the missing number
- EE.4** Changes in mean, median, mode and range
- EE.5** Identify an outlier
- EE.6** Identify an outlier and describe the effect of removing it
- EE.7** Describe distributions in line plots
- EE.8** Identify representative, random and biased samples
- EE.9** Create scatter plots
- EE.10** Identify trends with scatter plots
- EE.11** Make predictions with scatter plots
- EE.12** Outliers in scatter plots

## Probability

- FF.1** Probability of simple events
- FF.2** Probability of simple events and opposite events
- FF.3** Probability of mutually exclusive events and overlapping events
- FF.4** Experimental probability
- FF.5** Make predictions using theoretical probability
- FF.6** Make predictions using experimental probability
- FF.7** Compound events: find the number of outcomes
- FF.8** Probability of compound events

or another: word problems

- J.10** Find the total given a part and a percent
- J.11** Solve percent equations
- J.12** Solve percent equations: word problems
- J.13** Percent of change
- J.14** Percent of change: word problems
- J.15** Percent of change: find the original amount word problems

- T.17** Compare linear functions: graphs, tables and equations
- T.18** Equations of horizontal and vertical lines
- T.19** Graph a horizontal or vertical line
- T.20** Linear equations: solve for y

- FF.9** Find the number of outcomes: word problems
- FF.10** Find probabilities using two-way frequency tables

## Monomials and polynomials

- U.1** Identify monomials
- U.2** Model polynomials with algebra tiles
- U.3** Add and subtract polynomials using algebra tiles
- U.4** Add and subtract polynomials
- U.5** Add polynomials to find perimeter
- U.6** Multiply monomials
- U.7** Divide monomials
- U.8** Multiply and divide monomials
- U.9** Powers of monomials
- U.10** Square and cube roots of monomials
- U.11** Multiply a polynomial by a monomial
- U.12** Multiply polynomials using algebra tiles
- U.13** Multiply two binomials
- U.14** Multiply two binomials: special cases
- U.15** Multiply polynomials
- U.16** Multiply polynomials to find area