IXL Skill Plan

NSW Curriculum: Year 9

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Number and algebra

Number and finance

MA5-FIN-C-01: solves financial problems involving simple interest, earning money and spending money

1. Simple interest G56

MA5-FIN-C-02: solves financial problems involving compound interest and depreciation

1. Compound interest: word problems II 5T2
2. Continuously compounded interest II W6B

MA5-MAG-C-01: solves measurement problems by using scientific notation to represent numbers and rounding to a given number of significant figures

Scientific notation

1. Convert between standard and scientific notation AW7
2. Compare numbers written in scientific notation HMV
3. Add and subtract numbers written in scientific notation EGK
4. Multiply numbers written in scientific notation FGP
5. Divide numbers written in scientific notation X77

Measurement

6. Precision J95
7. Greatest possible error ES5
8. Minimum and maximum area and volume UBR
9. Percent error 7CP
10. Percent error: area and volume KKT

Algebra and equations

MA5-ALG-C-01: simplifies algebraic fractions with numerical denominators and expands algebraic expressions

Variable expressions

1. Distributive property LNW
2. Simplify variable expressions using properties XPG
3. Simplify variable expressions involving like terms and the distributive property VZV
4. Identify equivalent linear expressions ULJ

MA5-ALG-P-01: simplifies algebraic fractions involving indices, and expands and factorises algebraic expressions (Path: Adv)

Polynomials

5. Add and subtract polynomials using algebra tiles TKQ
6. Add and subtract polynomials SKE
7. Add polynomials to find perimeter HQ5
8. Multiply a polynomial by a monomial YNN
9. Multiply two polynomials using algebra tiles 6BY
10. Multiply two binomials 7AC
11. Multiply two binomials: special cases ME5

Monomials

1. Multiply monomials AWB
2. Divide monomials 6TF
3. Powers of monomials 9Q2

Expand expressions

4. Multiply two binomials 7AC
5. Multiply two binomials: special cases ME5

Factorise expressions

6. HCF of monomials 7X4
7. Factorise out a monomial 32R
8. Factorise quadratics with leading coefficient 1 M2N

MA5-ALG-P-02: selects and applies appropriate algebraic techniques to operate with algebraic fractions, and expands, factorises and simplifies algebraic expressions (Path: Adv)

Simplify algebraic fractions

1. Divide polynomials YJA

Expand expressions

2. Multiply two binomials 7AC
3. Multiply two binomials: special cases ME5
4. Multiply polynomials 5YD

Factorise expressions

5. HCF of monomials 7X4
6. Factorise out a monomial 32R
7. Factorise quadratics with leading coefficient 1 M2N
8. Factorise quadratics with other leading coefficients N6Y
9. Factorise quadratics: special cases UE7

10. Factorise quadratics using algebra tiles DB2
11. Factorise by grouping HUX

MA5-IND-C-01: simplifies algebraic expressions involving positive-integer and zero indices, and establishes the meaning of negative indices for numerical bases

Evaluate exponents

1. Powers with integer bases CNY
2. Powers with decimal and fractional bases WC2

Positive exponents

3. Multiplication with positive exponents 65U
4. Division with positive exponents 2M2
5. Multiplication and division with positive exponents UMK
6. Power rule with positive exponents GQ9

Negative exponents

7. Negative exponents 8UG
8. Multiplication with integer exponents UUC
9. Division with integer exponents H5Q
10. Multiplication and division with integer exponents MQD
11. Power rule with integer exponents WBW

Expressions involving exponents

12. Evaluate expressions using properties of exponents QVQ
13. Identify equivalent expressions involving exponents MHM

MA5-IND-P-01: applies the index laws to operate with algebraic expressions involving negative-integer indices (Path: Adv)

Monomials

1. Multiply monomials AWB
2. Divide monomials 6TF
3. Multiply and divide monomials 9JJ
4. Powers of monomials 9Q2

Exponents

5. Negative exponents QS6
6. Multiplication with exponents VRF
7. Division with exponents WEC
8. Multiplication and division with exponents UVB
9. Power rule 7PA

MA5-IND-P-02: describes and performs operations with surds and fractional indices (Path: Adv)

Rational exponents

1. Evaluate rational exponents YNQ
2. Multiplication with rational exponents 22S
3. Division with rational exponents J2V
4. Power rule with rational exponents SYG
5. Simplify expressions involving rational exponents I N5X
6. Simplify expressions involving rational exponents II BY6

Roots

7. Roots of integers FNL
8. Roots of rational numbers 6P6
9. Find roots using a calculator 8RL

Radical expressions

10. Simplify radical expressions KNP
11. Simplify radical expressions involving fractions LHF
12. Multiply radical expressions D8H
13. Add and subtract radical expressions CTS
14. Simplify radical expressions using the distributive property TXD
15. Simplify radical expressions using conjugates 2KS
16. Simplify radical expressions: mixed review 9F9

MA5-EQU-C-01: solves linear equations of up to 3 steps, limited to one algebraic fraction

Verify solutions

1. Does x satisfy the equation? FBQ

Model and solve equations

2. Model and solve equations using algebra tiles 7X5
3. Write and solve equations that represent diagrams QF5

Solve equations

4. Solve one-step linear equations KKQ
5. Solve two-step linear equations Y65
6. Solve advanced linear equations DVP

7. Solve equations with variables on both sides EHZ
8. Solve equations: complete the solution 9D3
9. Solve linear equations: word problems 46E
10. Solve linear equations: mixed review PTN

MA5-EQU-P-01: solves monic quadratic equations, linear inequalities and cubic equations of the form $ax^3=k$ (Path: Adv)

Linear inequalities

1. Graph inequalities U5N
2. Write inequalities from graphs N7D
3. Write and graph inequalities: word problems 9VA
4. Identify solutions to inequalities CH8
5. Solve one-step linear inequalities: addition and subtraction N8Q
6. Solve one-step linear inequalities: multiplication and division BDP
7. Solve one-step linear inequalities Y93
8. Graph solutions to one-step linear inequalities 9F5
9. Solve two-step linear inequalities DAC
10. Graph solutions to two-step linear inequalities 65R
11. Solve multi-step linear inequalities JBM
12. Graph solutions to advanced linear inequalities E2T

Non-linear equations

13. Solve equations involving cubes and cube roots L5L
14. Solve a quadratic equation with leading coefficient 1 by factorising UME

MA5-EQU-P-02: solves linear equations of more than 3 steps, monic and non-monic quadratic equations, and linear simultaneous equations (Path: Adv)

Linear equations

1. Solve equations with variables on both sides EHZ
2. Solve equations: complete the solution 9D3
3. Solve linear equations: mixed review PTN

Simultaneous linear equations

4. Is (x, y) a solution to the simultaneous equations? 42U
5. Solve simultaneous equations by graphing FBU

6. Solve simultaneous equations by graphing: word problems AJU
7. Find the number of solutions to simultaneous equations by graphing P8R
8. Find the number of solutions to simultaneous equations MJR
9. Solve simultaneous equations using substitution HX7
10. Solve simultaneous equations using substitution: word problems S74
11. Solve simultaneous equations using elimination PZA
12. Solve simultaneous equations using elimination: word problems 2VM
13. Solve simultaneous equations using any method 2RC
14. Solve simultaneous equations using any method: word problems 7E7

Literal equations

15. Rearrange multi-variable equations B47
16. Linear equations: solve for y GF9

Quadratic equations

17. Solve a quadratic equation using square roots GYU
18. Solve a quadratic equation using the zero product property ZN5
19. Solve a quadratic equation with leading coefficient 1 by factorising UME
20. Solve a quadratic equation with other leading coefficients by factorising Y5P
21. Complete the square EG5
22. Solve a quadratic equation with leading coefficient 1 by completing the square ADN
23. Solve a quadratic equation with other leading coefficients by completing the square R8D
24. Solve a quadratic equation using the quadratic formula ZSC
25. Using the discriminant KZZ

MA5-LOG-P-01: establishes and applies the laws of logarithms to solve problems (Path: Adv)

1. Convert between exponential and logarithmic form: rational bases 7AH
2. Evaluate logarithms 2UT
3. Change of base formula T6P
4. Identify properties of logarithms BCW
5. Product property of logarithms EKG
6. Quotient property of logarithms S7A
7. Power property of logarithms J52
8. Properties of logarithms: mixed review 5ZC
9. Evaluate logarithms: mixed review LHA

Ratios and rates

MA5-RAT-P-01: identifies and solves problems involving direct and inverse variation and their graphical representations (Path: Stn, Adv)

Proportions

1. Solve proportions: word problems XQM
2. Estimate population size using proportions 83W

Constant of proportionality

3. Find the constant of proportionality from a table T96
4. Find the constant of proportionality from a graph 2G5

Identify proportional relationships

5. Identify proportional relationships by graphing NA8
6. Identify proportional relationships XEA

Represent proportional relationships

7. Write equations for proportional relationships from tables 94E
8. Write equations for proportional relationships from graphs 9Q5
9. Graph proportional relationships ACW
10. Interpret graphs of proportional relationships CFT
11. Write and solve equations for proportional relationships KAZ

MA5-RAT-P-02: analyses and constructs graphs relating to rates of change (Path: Adv)

1. Rate of change HPH
2. Constant rate of change T5W

3. Find the constant of proportionality from a graph 2G5

Linear and non-linear relationships

MA5-LIN-C-01: determines the midpoint, gradient and length of an interval, and graphs linear relationships, with and without digital tools

1. Find the gradient and y-intercept of a linear equation HQS
2. Graph an equation in y=mx+c form PEL
3. Write an equation in y=mx+c form from a graph SSA
4. Write an equation in y=mx+c form from a table LBF
5. Complete a table and graph a linear equation TE6
6. Equations of horizontal and vertical lines P7N
7. Graph a horizontal or vertical line TB5

MA5-LIN-C-02: graphs and interprets linear relationships using the gradient/slope-intercept form

Gradient/slope-intercept form

1. Find the gradient and y-intercept of a linear equation HQS
2. Graph an equation in y=mx+c form PEL
3. Write an equation in y=mx+c form from a graph SSA
4. Write an equation in y=mx+c form SZV
5. Write an equation in y=mx+c form from a table LBF
6. Write an equation in y=mx+c form from a word problem HBP

Parallel and perpendicular lines

7. Gradients of parallel and perpendicular lines CKW
8. Write an equation for a parallel or perpendicular line TBF

MA5-LIN-P-01: describes and applies transformations, the midpoint, gradient/slope and distance formulas, and equations of lines to solve problems (Path: Adv)

Midpoint and distance formulas

1. Midpoint formula: find the midpoint WQ9
2. Midpoint formula: find an endpoint UDA
3. Distance between two points GN6

Gradient formula

4. Find the gradient of a graph TYA
5. Find the gradient from two points TXR

6. Find a missing coordinate using gradient BR9

Gradient/slope-intercept form

7. Find the gradient and y-intercept of a linear equation HQS
8. Graph an equation in y=mx+c form PEL
9. Write an equation in y=mx+c form from a graph SSA
10. Write an equation in y=mx+c form SZV
11. Write an equation in y=mx+c form from a table LBF
12. Write an equation in y=mx+c form from a word problem HBP
13. Write linear equations to solve word problems UVQ
14. Complete a table and graph a linear equation TE6

Standard form

15. Write equations in standard form 94S
16. Standard form: find x- and y-intercepts FYH
17. Standard form: graph an equation QQA

Horizontal and vertical lines

18. Equations of horizontal and vertical lines P7N
19. Graph a horizontal or vertical line TB5

Point-gradient form

20. Point-gradient form: graph an equation JVD
21. Point-gradient form: write an equation FGE
22. Point-gradient form: write an equation from a graph F8Z

Parallel and perpendicular lines

23. Gradients of parallel and perpendicular lines CKW
24. Write an equation for a parallel or perpendicular line TBF

MA5-NLI-C-01: identifies connections between algebraic and graphical representations of quadratic and exponential relationships in various contexts

1. Characteristics of quadratic graphs 27P
2. Characteristics of quadratic equations WCB
3. Quadratic equations: complete a table MPF

4. Graph quadratic equations SDU

MA5-NLI-C-02: identifies and compares features of parabolas and exponential curves in various contexts

1. Identify linear and quadratic functions from graphs U9A
2. Identify linear and quadratic functions from tables GP5
3. Characteristics of quadratic graphs 27P

MA5-NLI-P-01: interprets and compares non-linear relationships and their transformations, both algebraically and graphically (Path: Adv)

Linear and nonlinear relationships

1. Identify linear and nonlinear relationships 42S

Exponential functions

2. Domain and range of exponential functions 9N9
3. Match exponential functions and graphs I AXG
4. Match exponential functions and graphs II DQA

Quadratic functions

5. Characteristics of quadratic graphs 27P
6. Characteristics of quadratic equations WCB
7. Graph quadratic equations SDU
8. Transformations of quadratic functions KA8

Circles

9. Write equations of circles from graphs W6M
10. Write equations of circles using properties EXH
11. Graph circles YCX

MA5-POL-P-01: defines, operates with and graphs polynomials and applies the factor and remainder theorems to solve problems (Path: Adv, Ext)

Understand polynomials

1. Polynomial vocabulary NZ9
2. Model polynomials with algebra tiles ZQ6

Add and subtract polynomials

3. Add and subtract polynomials using algebra tiles TKQ
4. Add and subtract polynomials SKE
5. Add polynomials to find perimeter HQ5

Multiply polynomials

6. Multiply a polynomial by a monomial YNN
7. Multiply two polynomials using algebra tiles 6BY
8. Multiply polynomials 5YD

MA5-FNC-P-01: uses function notation to describe and graph functions of one variable and graphs inequalities in one and 2 variables (Path: Adv)

Divide polynomials

9. Divide polynomials YJA
10. Divide polynomials using synthetic division ZRV

Roots

11. Find the roots of factorised polynomials D7G
12. Write a polynomial from its roots CYR

Graphs

13. Match polynomials and graphs 86U

Relations and functions

1. Relations: convert between tables, graphs, mappings and lists of points XTE
2. Identify functions BLU
3. Identify functions: vertical line test HY8
4. Domain and range of relations CJD

Function notation and graphs

5. Find values using function graphs WNC
6. Evaluate a function NSH
7. Complete a function table from a graph UFY
8. Complete a function table from an equation LJZ
9. Interpret the graph of a function: word problems MYX
10. Graph a linear inequality in the coordinate plane ERU

Measurement and space

Pythagoras and trigonometry

MA5-TRG-C-01: applies trigonometric ratios to solve right-angled triangle problems

1. Trigonometric ratios: sin, cos and tan 2KT
2. Find trigonometric functions using a calculator HSM
3. Trigonometric ratios: find a side length 38Z
4. Trigonometric ratios: find an angle measure G6H
5. Solve a right triangle EAD

MA5-TRG-C-02: applies trigonometry to solve problems, including bearings and angles of elevation and depression

MA5-TRG-P-01: applies Pythagoras' theorem and trigonometry to solve 3-dimensional problems and applies the sine, cosine and area rules to solve 2-dimensional problems, including bearings (Path: Stn, Adv)

Pythagoras' theorem

1. Pythagoras' theorem: find the length of the hypotenuse FTW
2. Pythagoras' theorem: find the missing leg length 2QP
3. Pythagoras' theorem: find the missing leg or hypotenuse length CLP
4. Pythagoras' theorem: word problems MLH

Sine and Cosine

5. Sine Rule TB7
6. Cosine Rule FDU
7. Area of a triangle: Sine Rule HBN

MA5-TRG-P-02: establishes and applies the properties of trigonometric functions and finds solutions to trigonometric equations (Path: Adv)

1. Find trigonometric functions of special angles GEJ
2. Trigonometric ratios: sin, cos and tan 24H
3. Find trigonometric ratios using the unit circle KGU
4. Trigonometric functions of complementary angles XBY
5. Sin, cos and tan of special angles YFB
6. Find trigonometric functions using a calculator UVV

Length, area and volume

MA5-ARE-C-01: solves problems involving the surface area of right prisms and practical problems involving the area of composite shapes and solids

Area

1. Area LVH
2. Area of compound figures with triangles 32F
3. Area of compound figures with triangles, semicircles and quarter circles RJQ

Surface area

4. Surface area of cylinders 2UY
5. Surface area of prisms XNN
6. Surface area of cylinders and prisms YSU

MA5-ARE-P-01: applies knowledge of the surface area of right pyramids and cones, spheres and composite solids to solve problems (Path: Stn, Adv)

1. Surface area of pyramids and cones 78J

MA5-VOL-C-01: solves problems involving the volume of composite solids consisting of right prisms and cylinders

1. Volume of cylinders 47J
2. Volume of prisms ZCK
3. Volume of cubes and rectangular prisms: word problems AEC
4. Volume of cylinders and prisms NFH

MA5-VOL-P-01: applies knowledge of the volume of right pyramids, cones and spheres to solve problems involving related composite solids (Path: Stn, Adv)

1. Volume of pyramids and cones WDA
2. Surface area and volume of spheres JKB

Geometrical properties and figures

MA5-GEO-C-01: identifies and applies the properties of similar figures and scale drawings to solve problems

1. Scale drawings: word problems AD9
2. Identify similar figures JY8
3. Ratios in similar figures B2S
4. Similarity statements MXW
5. Determine if two figures are similar: justify your answer SSC
6. Similar figures: side lengths and angle measures PVP
7. Similar triangles and indirect measurement SRP
8. Similarity rules for triangles ZHF

MA5-GEO-P-01: establishes conditions for congruent triangles and similar triangles and solves problems relating to properties of similar figures and plane shapes (Path: Ext)

Congruence

1. Congruent figures: side lengths and angle measures DS8
2. Congruent triangles: SSS, SAS and ASA AB7

Similarity

3. Similarity rules for triangles ZHF
4. Areas of similar figures MGN
5. Volume and surface area of similar solids 5RV
6. Perimeter, area and volume: changes in scale QFP

Interior angles

7. Interior angles of polygons DMS

MA5-GEO-P-02: constructs proofs involving congruent triangles and similar triangles and proves properties of plane shapes (Path: Ext)

1. Similarity rules for triangles ZHF
2. Proving triangles congruent by SSS and SAS UXL
3. Proving triangles congruent by ASA and AAS QB6
4. Proving triangles congruent by SSS, SAS, ASA and AAS NPF
5. Proofs involving corresponding parts of congruent triangles VB2
6. Proofs involving isosceles triangles UXT
7. Proofs involving triangles I 6AT
8. Proofs involving triangles II GZ6

MA5-CIR-P-01: applies deductive reasoning to prove circle theorems and solve related problems (Path: Ext)

1. Parts of a circle XJJ
2. Central angles WLY
3. Arc measure and arc length 6SD
4. Circle measurements: mixed review DPZ
5. Arcs and chords Y66
6. Tangent lines AV8

Statistics and probability

Data classifications, visualisation and analysis

MA5-NET-P-01: solves problems involving the characteristics of graphs/networks, planar graphs and Eulerian trails and circuits (Path: Stn)

MA5-DAT-C-01: compares and analyses datasets using summary statistics and graphical representations

1. Calculate mean, median, mode and range C5U
2. Quartiles 7GZ
3. Variance and standard deviation JAH
4. Box plots 25M

MA5-DAT-C-02: displays and interprets datasets involving bivariate data

1. Create scatter plots EMT
2. Identify trends with scatter plots PK5
3. Make predictions with scatter plots HLM
4. Outliers in scatter plots FNE
5. Scatter plots: line of best fit SRE

MA5-DAT-P-01: plans, conducts and reviews a statistical inquiry into a question of interest (Path: Stn, Adv)

1. Identify biased samples XF7

Probability

MA5-PRO-C-01: solves problems involving probabilities in multistage chance experiments and simulations

1. Compound events: find the number of outcomes 5W5
2. Identify independent and dependent events 46F
3. Probability of independent and dependent events MAH

MA5-PRO-P-01: solves problems involving Venn diagrams, 2-way tables and conditional probability (Path: Adv)

1. Find probabilities using two-way frequency tables PGT
2. Find conditional probabilities using two-way frequency tables LYH