Topic: 1 Percentages

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
10.1.1 Use repeated percentage change		
π Calculate the total percentage increase when an increase of 30% is followed by a decrease of 20%		
10.1.2 Solve compound interest problems		
π Use indices with a percentage multiplier to calculate compound interest calculations		
π Calculate the multiplier given the original amount, final amount and number of years of a compound interest calculation		

Topic: 2 Linear Equations

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
10.2.1 Calculate the gradient of a straight line given the coordinates of two points		
10.2.2 Find the equation of a straight line given the coordinates of two points		
10.2.3 Find the equation of a straight line parallel to a given line		
10.2.4 Find the equation of a straight line perpendicular to a given line		

Topic: 3 Circle Properties

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
10.3.1 Understand chord and tangent properties of circles		
10.3.2 Understand and use the internal and external intersecting chord properties		
10.3.3 Recognise the term 'cyclic quadrilateral'		
10.3.4 Understand and use angle properties of the circle including:		
π angle subtended by an arc at the centre of a circle is twice the angle subtended at any point on the remaining part of the circumference;		
π angle subtended at the circumference by a diameter is a right angle;		
π angles in the same segment are equal;		
π the sum of the opposite angles of a cyclic quadrilateral is 180;		
π the alternate segment theorem		

Topic: 4 Arcs and Sectors

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
10.4.1 Find perimeters and areas of sectors of circles		
π Apply the formulas and understand how the angle determines the fraction		
Find the radius given the perimeter or area of a sector		

Topic: 5 Probability

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
10.5.1 Draw and use tree diagrams		
π Construct a tree diagram for two events with two outcomes		
π Construct a tree diagram for up to three events and three outcomes		
10.5.2 Determine the probability that two or more independent events will both occur		
π Use multiplication to calculate the probability of independent events		
10.5.3 Determine the probability that two or more dependent events will both occur		
π Picking two balls out of a bag, one after the other, without replacement		
10.5.4 Conditional probability from tree diagrams		
10.5.5 Apply probability to simple problems		
π Solve problems in different contexts selecting a correct method to list the outcomes		

Topic: 6 Similarity

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
10.6.1 Understand and use the geometrical properties that similar figures have corresponding lengths in the same ratio but corresponding angles remain unchanged		
π Know the mathematical definition of the word 'similar'		
π Identify the scale factor between similar shapes and use to calculate missing sides		
10.6.2 Use and interpret maps and scale drawings		
π Use a ratio to describe the scale of a drawing		
π Calculate lengths from maps and scale drawings		
π Calculate lengths which involve different units		
10.6.3 Understand that areas of similar figures are in the ratio of the square of corresponding sides		
π Know that the scale factor for the area of a shape is the square of the SF for length		
10.6.4 Understand that volumes of similar figures are in the ratio of the cube of corresponding sides		
π Know that the scale factor for the volume of a shape is the cube of the SF for length		
10.6.5 Use areas and volumes of similar figures in solving problems		
π Solve problems where a scale factor is given for one dimensions and you must calculate in another.		

Topic: 7 3D Shapes and Volume

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref

10.7.1 Convert between units of volume within the metric system
- Convert between mm^2, cm^2, m^2 & km^2
- Convert between mm^3, cm^3, m^3 & km^3

10.7.2 Find the surface area and volume of a sphere and a right circular cone using relevant formulae
- Know the formula and be able to apply
- Solve problems involving multiple applications of the formulae
- Solve problems where you need to use simultaneous equations to eliminate a variable

Topic: 8 Algebraic Manipulation

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref

10.8.1 Understand the concept of a quadratic expression and be able to factorise such expressions
- Apply the 'AC' method to factorise any quadratic where the coefficient of the x^2 term is not 1 or -1
- Factorise quadratics using a combination of common factor, difference of two squares & 'AC' method
- Factorise an expression where the common factor is an expression: $(x+1)(x-6)-(x+1)(x^2-4)$

10.8.2 Solve quadratic equations by factorisation
- $x^2-7x+12=0$
- $x(3x-2)=5$
- $2x^2-3x+1=0$

Link to sketch of the quadratic graphs where students identify the roots and y-intercept

10.8.3 Complete the square for a given quadratic expression (limited to $a = 1$)
- Write $x^2+6x-1=0$ in the form $(x+b)^2+c$
- Solve $(x+b)^2+c=0$ leaving answers in the form $x=f\pm\sqrt{g}$ where f and g are integers to be found

Link to vertex sketch of the quadratic graph

10.8.4 Complete the square for a given quadratic expression (limited to $a \neq 1$)
- Write $2x^2+6x-1=0$ in in the form $a(x+b)^2+c=0$
- Use this to identify the vertex coordinates

Topic: 9 Powers and Roots

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref

10.9.1 Understand the meaning of surds
- Know that a surd is an irrational number and understand why simplifying them is necessary

10.9.2 Manipulate surds, including rationalising a denominator
- Simplify a surd by identifying square numbers
- Expand brackets involving surds: $\left(1+\sqrt{2}\right)\left(3-\sqrt{4}\right)$
- Rationalise the denominator of a surd using the conjugate

10.9.3 Use index laws to simplify and evaluate numerical and algebraic expressions involving integer, fractional and negative powers

- π Simplify whole numbers and fractions given in index form with negative and fractional powers
- π Simplify algebraic expressions using all the index laws

Topic: 10 Graphical Representation of Data

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
10.10.1 Construct and interpret histograms		
π Construct a histogram from a frequency table		
π Complete a histogram given a part complete chart and table		
π Interpret a histogram calculating a required frequency		
10.10.2 Understand the concept of a measure of spread		
10.10.3 Find the interquartile range from a discrete data set		
10.10.4 Construct cumulative frequency diagrams from tabulated data		
10.10.5 Estimate the median from a cumulative frequency diagram		
10.10.6 Estimate the interquartile range from a cumulative frequency diagram		
10.10.7 Use cumulative frequency diagrams		

Topic: 11 Simultaneous Linear Equations

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
10.11.1 Calculate the exact solution of two simultaneous equations in two unknowns		
π Solve simple problems where only one equation needs to be changed		
π Solve problems where both equations need to be changed		
π Solve problems in context		
10.11.2 Interpret the equations as lines and the common solution as the point of intersection		
π Graph two straight lines and identify the intersection as the solution of simultaneous equations.		

Topic: 12 Proportion

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
10.12.1 Set up problems involving direct or inverse proportion and relate algebraic solutions to graphical representation of the equations		
π Solve problems with two variables with no powers or roots for direct and indirect proportion		
π Solve problems involving roots and powers for direct and indirect proportion		
π Solve problems with mixed direct/indirect proportion with powers and roots		

Topic: 13 Inequalities

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
10.13.1 Represent simple linear inequalities on rectangular cartesian graphs		
π Plot single lines and identify which direction the inequality lies		
10.13.2 Identify regions on rectangular cartesian graphs defined by simple linear inequalities		
π Identify regions formed by the axes, one diagonal line and one horizontal/vertical line		
10.13.3 Identify harder examples of regions defined by linear inequalities		
π Identify any region formed by linear inequalities		