Topic: 1 Algebraic Manipulation

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
9.3.1 Take out common factors		2.2, D(F)
π Single numerical factor: $4x + 8$		
π Numerical and algebraic factor: $3x - 9x^3$		
π Linear factor: $(x - 1)(3x - 2) + (x - 1)(x + 9)$		
9.3.2 Expand the product of two simple linear expressions		2.2, E(F)
π Emphasize the distributive property: $(a + b)(c + d) = a(c + d) + b(c + d)$		
9.3.3 Understand the concept of a quadratic expression and be able to factorise such expressions (limited to $x^2 + bx + c$)		2.2, F(F)
π Ensure all combinations of negatives are examined and compared:		

$x^2 + 6x + 8$	$x^2 - 6x + 8$	$x^2 - 2x - 8$	$x^2 + 2x - 8$

9.3.4 Be able to recognise, expand and factorise difference of two squares: $a^2 - b^2 = (a + b)(a - b)$

Suggested Extension: Factorise quadratics where each term is divisible by the same integer (including negative 1):

$$2x^2 + 10x + 12 = 2(x^2 + 5x + 6) = 2(x + 2)(x + 3)$$
$$8 - 2x - x^2 = -1(x^2 + 2x - 8) = -(x + 4)(x - 2)$$

Topic: 2 Percentages

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
9.2.1 Use reverse percentages		1.6, F(F)
π In a sale, prices were reduced by 30%. The sale price of an item was 17.50. Calculate the original price item.		
π Make sure pupils understand terms such as VAT and APR which may not be common knowledge in UAE. British VAT at 20%.		
9.2.2 Use compound interest and depreciation		1.6, G(F)
π Simple calculations that involve a max of three iterations with no indices on the multiplier.		

Topic: 3 Linear Equations

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
9.1.1 Solve linear equations, with fractional coefficients, in one unknown in which the unknown appears on either side or both sides of the equation:		2.4, A(F)

$\frac{4x+5}{2} = 3$	$\frac{x}{2} + 1 = 8 - \frac{3x}{5}$	$\frac{x+1}{2} = \frac{3-x}{5}$	$\frac{2x}{3} - 5 = \frac{x+1}{2}$
$\frac{x}{3} - 5 = 10$	$\frac{2(x+1)}{3} + \frac{5(x-5)}{4} = 2$	$\frac{x-2}{3} - \frac{x+1}{5} = 1$	$\frac{1}{3}x - 2 = \frac{3}{5}(1-2x)$

NA

Suggested extension: Solve equations where x^2 terms cancel on both sides: $x(x+6) = x^2 + 5x + 6$

Topic: 4 Statistical Measures

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
9.4.1 Calculate an estimate for the mean for grouped data		6.2, C(F)
π Also look at finding the total of the frequency and the distinction between this and the mean		
9.4.2 Identify the modal class for grouped data		6.2, D(F)

Topic: 5 Expressions and Formulae

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
9.5.1 Use formulae from mathematics and other real-life contexts expressed initially in words or diagrammatic form and convert to letters and symbols		2.3, D(F)
9.5.2 Derive a formula or expression		2.3, E(F)
9.5.3 Know the inverse operations of squares, cubes and roots.		
9.5.4 Change the subject of a formula where the subject appears once		2.3, F(F)
π Make r the subject of $A = \pi r^2$		
π Make t the subject of $v = u + at$		
π Make v the subject of $E = \frac{1}{2}mv^2$		

Topic: 6 Graphs

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
9.6.2 Determine the coordinates of the midpoint of a line segment, given the coordinates of the two end points		3.3, E(F)
π Also ask for an end point given the start and the mid-point		
9.6.4 Find the gradient of a straight line		3.3, G(F)
π Gradient is the distance travelled in the y-direction after going 1 unit in the x-direction		

- π Gradient = (increase in y) ÷ (increase in x)
- π Use the equation for a gradient between two points: $m = \frac{y_2 - y_1}{x_2 - x_1}$

9.6.5 Recognise that equations of the form y = mx + c are straight line graphs with gradient m and intercept on the y-axis at the point (0, c) — 3.3, H(F)

- π Write down the gradient and coordinates of the y-intercept of eg; $y = 3x + 5$ & $2y - 4x = 6$
- π Write down the equation of the straight line with gradient 6 that passes through the point $(0, 2)$

9.6.6 Be able to find the equation of a line given a gradient and a coordinate it passes through (not y-intercept).

Eg: Find the equation of a line with gradient -2 which passes through coordinate $(5, -3)$.

9.6.7 Apply knowledge of straight line graphs to solve simultaneous equations graphically.

Eg: Consider the graphs of $y = 2x + 3$ and $y = 9 - x$. Find the point of intersection, and hence solve the pair of simultaneous equations.

Topic: 7 Set Language and Set Notation

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
9.9.1 Understand the definition of a set		1.5, A(F)
9.9.2 Use the set notation ξ,∪,∩, ∈, ∅ & ∉		1.5, B(F)
9.9.3 Understand the concept of the Universal Set and the Empty Set and the symbols for these sets		1.5, C(F)
9.9.4 Understand and use the complement of a set		1.5, D(F)
π Use the notation A'		
9.9.5 Understand sets defined in algebraic terms, and understand and use subsets		
If A is a subset of B, then $A \subset B$		
9.9.6 Know, understand and use the concept of the number of elements in a set. Including using the n notation: $n(a)$		
9.9.7 Use Venn diagrams to represent sets.		1.5, E(F)
9.9.8 Be able to sort information into a Venn diagram.		

Topic: 8 Polygons

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
9.8.1 Know the term 'regular polygon' and calculate interior and exterior angles of regular polygons		4.2, D(F)
π Identify regular and irregular polygons		
π Identify the exterior and interior angles of a polygon		
π Find the exterior angle of a polygon using the formula		

9.8.2	Know and use the angle sum of polygons	4.2, E(F)
	π For a polygon with n sides, the sum of the interior angles is $(2n-4)$ right angles	
9.8.3	Know congruence as meaning the same shape and size	4.2, F(F)
9.8.4	Know that two or more polygons with the same shape and size are said to be congruent to each other	4.2, G(F)

Topic: 9 Probability

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
9.9.1 List all the outcomes for single events and for two successive events in a systematic way.		
Select a sample space diagram, Venn diagram or frequency table to record information and then calculate probabilities from it.		
9.9.2 Calculate the probability of the complement of an event happening.		
Know that subtracting from 1 gives the complement.		
9.9.3 Use the addition rule of probability for mutually exclusive events.		
Use the 'OR' rule to find probabilities different events.		
9.9.4 Understand and use the term expected frequency		

Topic: 10 Inequalities

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
9.10.1 Understand and use the symbols $>, <, \geq$ and $\leq$		1.5, A(F)
π Write inequalities using the notation from context		
9.10.2 Understand and use the convention for open and closed intervals on a number line		1.5, B(F)
π Express inequalities on a number line for intervals		
9.10.3 Solve simple linear inequalities in one variable and represent the solution set on a number line		1.5, C(F)
π Solve linear inequalities in one variable expressing the solution on a number line or as a list of integers		
π Solve an enclosed interval: $-4 < 2x + 2 < 20$		
9.10.4 Emphasise the issues with dividing by a negative or moving a variable to the other side of an equation.		
π Eg; $-3x > 9$, $9 - 2x \leq -3$		

Topic: 11 Transformation Geometry

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
9.11.1 Understand that enlargements are specified by a centre and a scale factor		5.2, J(F)
9.11.2 Understand that enlargements preserve angles and not lengths		5.2, K(F)
9.11.3 Enlarge a shape given the scale factor		5.2, L(F)
π Positive integer and positive fractional scale factors covered.		
9.11.4 Identify and give complete descriptions of transformations (mixed transformations)		5.2, M(F)
π Complete problems involving a mix of rotations, reflections, enlargements and translations		

Topic: 12 Measures

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
9.12.1 Understand and use the relationship between average speed, distance and time		4.4, F(F)
π Apply the formula both with numbers and algebraically		
π Solve problems with changes to units. I.e. time given in minutes but speed in km/h		
9.12.2 Interpret information presented in a range of linear and non-linear graphs		3.3, A(F)
π Distance/time graphs		
π Speed/time graphs		
9.12.3 Know and use the formulas for density and pressure.		
Apply these to exam style questions, including questions involving area/volume calculations.		

Topic: 13 Standard Form

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
9.13.1 Calculate with and interpret numbers in the form $a \times 10^n$ where n is an integer and $1 \leq a < 10$		1.9, A(F)
9.13.2 Solve problems involving standard form		1.9, A(H)
π Compare values given in standard form		
π Use the calculator to complete calculations given in standard form		
π Express answers in normal form or standard form		
9.13.3 Be able to multiply and divide in standard form, converting the answer back into standard form.		

Topic: 14 Decimals

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
9.14.1 Convert recurring decimals into fractions		1.3, A(H)
π Express $0.\dot{7}$ as a fraction in its simplest form		
π Express $0.2\dot{9}$ as a fraction in its simplest form		
π Express $0.\dot{3}1\dot{4}$ as a fraction in its simplest form		
9.14.2 Suggested extension: multiply recurring decimals by converting them to fractions first:		
Eg: $0.\dot{4} \times 0.125 =$ $\quad$ $1.3\dot{5}\dot{6} \times 0.\dot{6} =$		

Topic: 15 Trigonometry and Pythagoras' Theorem

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
9.15.1 Know, understand and use sine, cosine and tangent of acute angles to determine lengths and angles of a right-angled triangle		4.8, B(F)
9.15.2 Apply trigonometrical methods to solve problems in two dimensions		4.8, C(F)
π Solve problems in context involving both Pythagoras' Theorem and Trigonometry		
9.15.3 Apply trigonometry to connected triangles involving a combination of pythagoras and trigonometry.		
9.15.6 Be able to calculate angles of elevation and depression.		

Topic: 16 Graphs

Learning Outcomes and Scaffolding	Textbook Ref	Edexcel Ref
9.16.1 Recognise, generate points and plot graphs quadratic functions.		3.3, I(F)
π Know the common features of a linear graph, y-intercept and gradient and be able to use these on the grid		
π Use the calculator to create a table of values for drawing the graph		
π Know that a quadratic graph is symmetrical and use it to help you find the coordinates		
9.16.2 Recognise, plot and draw graphs with equation: $y = Ax^3 + Bx^2 + Cx + D$ in which: (i) the constants are integers, and some could be zero (ii) the letters x and y can be replaced with any other two letters		3.3, A(H)
π Know a cubic graph has two turning points and be able to identify the y-intercept		
9.16.3 Be able to recognise the graphs of straight line, quadratic and cubic graphs, matching the graphs to the equation based on the simple features of the curves.		