

# MARINA INTERNATIONAL SCHOOL

## EXTENDED MATHEMATICS SCHEME OF WORK

### FORM 4 - TERM 1

WEEK	TOPIC	TOPIC DETAILS
1.1	NUMBER	Identify and use natural numbers, integers (positive, negative and zero), prime numbers, square numbers, common factors and common multiples, rational and irrational numbers (e.g. $\pi$ ), real numbers, reciprocals $\pi$
1.2	NUMBER	Includes expressing numbers as a product of prime factors.
1.3	NUMBER	Finding the Lowest Common Multiple (LCM) and Highest Common Factor (HCF) of two numbers.
1.4	NUMBER	Calculate with squares, square roots, cubes and cube roots and other powers and roots of numbers,
2.1	NUMBER	Use directed numbers in practical situations, e.g. temperature changes, flood levels
2.2	NUMBER	Use the four rules for calculations with whole numbers, decimals and fractions (including mixed numbers and improper fractions), including correct ordering of operations and use of brackets. (BIDMAS RULE Applies to positive and negative numbers.
2.3	NUMBER	Order quantities by magnitude and demonstrate familiarity with the symbols $=, \neq, >, <, \geq, \leq$
3.1	APPROXIMATION	Make estimates of numbers, quantities and lengths, give approximations to specified numbers of significant figures and decimal places and round off answers to reasonable accuracy in the context of a given problem.
3.2	APPROXIMATION	Use a calculator efficiently.
3.3	APPROXIMATION	Apply appropriate checks of accuracy
4.1	LIMITS OF ACCURACY	Give appropriate upper and lower bounds for data given to a specified accuracy, e.g. measured lengths.

WEEK	TOPIC	TOPIC DETAILS
4.2	LIMITS OF ACCURACY	Obtain appropriate upper and lower bounds to solutions of simple problems given data to a specified accuracy, e.g. the calculation of the perimeter or the area of a rectangle.
5.1	STANDARD FORM	Convert numbers into and out of standard form.
5.2	STANDARD FORM	Calculate with values in standard form
6.1	FRACTIONS AND DECIMALS	Conversion of recurring decimals to fractions, e.g. change to a fraction $0.7\overline{00}$
6.2	FRACTIONS AND DECIMALS	Use the language and notation of simple vulgar and decimal fractions and percentages in appropriate contexts.
6.3	FRACTIONS AND DECIMALS	Recognise equivalence and convert between these forms.
7.1	INDICES	Understand the meaning of indices (fractional, negative and zero) and use the rule of indices
7.2	INDICES	Use and interpret positive, negative and zero indices.
7.3	INDICES	Use the rules of indices, to simplify exponential equations
8.1	SET	Understand notation of Venn diagrams.
8.2	SET	<ul style="list-style-type: none"> <li>□ Definition of sets</li> <li>e.g. <math>A = \{x: x \text{ is a natural number}\}</math></li> <li><math>B = \{a,b,c,\dots\}</math></li> <li>Notation</li> <li>Number of elements in set A; <math>n(A)</math></li> <li>Universal set</li> <li>Union of A and B; <math>\cup AB</math></li>   <li>Intersection of A and B; <math>\cap AB</math></li> </ul>
8.3	SET	Use language, notation and Venn diagrams to describe sets and represent relationships between sets

WEEK	TOPIC	TOPIC DETAILS
8.4	SET	<p>Definition of sets  e.g. <math>A = \{x: x \text{ is a natural number}\}</math>  <math>B = \{(x,y): y = mx + c\}</math>  <math>C = \{x: a \leq x \leq b\}</math>  <math>D = \{a, b, c, \dots\}</math></p> <p>Notation  Number of elements in set A; <math>n(A)</math>  "...is an element of..." <math>A; \in</math></p> <p>"...is not an element of..."; <math>\notin</math>  Complement of set A; <math>A'</math></p> <p>The empty set; <math>\emptyset</math></p> <p>Universal set;  A is a subset of B; <math>A \subseteq B</math>  A is a proper subset of B; <math>A \subset B</math>  A is not a subset of B; <math>A \not\subseteq B</math>  A is not a proper subset of B; <math>A \not\subset B</math>  Union of A and B; <math>\cup AB</math></p> <p>Intersection of A and B; <math>\cap A</math></p>
9.1	RATIO AND PROPORTION	Demonstrate an understanding of ratio and proportion.
9.2	RATIO AND PROPORTION	Calculate average speed.
9.3	RATIO AND PROPORTION	Increase and decrease a quantity by a given ratio
9.4	RATIO AND PROPORTION	Use common measures of rate.
10.1	TIME	Calculate times in terms of the 24-hour and 12-hour clock.
10.2	TIME	Read clocks, dials and timetables
11.1	ALGEBRIAC EXPRESSIONS	Use letters to express generalized numbers and express basic arithmetic processes algebraically.
11.2	ALGEBRIAC EXPRESSIONS	Substitute numbers for words and letters in formulae.
11.3	ALGEBRIAC EXPRESSIONS	Rearrange simple formulae.

WEEK	TOPIC	TOPIC DETAILS
11.4	ALGEBRAIC EXPRESSIONS	Construct simple expressions and set up simple equations subtitle e.g. transform formulae where the subject appears twice
12.1	EXPANSION AND FACTORIZATION OF ALGEBRAIC EXPRESSIONS	Use brackets and extract common factors, e.g. expand $3x(2x - 4y)$ factorise $9x^2 + 15xy$
12.2	EXPANSION AND FACTORIZATION OF ALGEBRAIC EXPRESSIONS	Expand products of algebraic expressions (two brackets only), e.g. expand $(x + 4)(x - 7)$ ; for extended include products of more than two brackets, e.g. $(x + 4)(x - 7)(2x + 1)$
12.3	EXPANSION AND FACTORIZATION OF ALGEBRAIC EXPRESSIONS	Factorise where possible expressions of the form: $ax + bx + kay + kby$ $a^2x^2 - b^2y^2$ $a^2 + 2ab + b^2$ $ax^2 + bx + c$
13.1	ALGEBRAIC FRACTIONS	Manipulate algebraic fractions,
13.2	ALGEBRAIC FRACTIONS	Factorise and simplify rational expressions,
14.1	EQUATIONS	Derive and solve simple linear equations in one unknown
14.2	EQUATIONS	Derive and solve simultaneous linear equations in two unknowns
14.3	EQUATIONS	Solving quadratic equations
15.1	EQUATIONS	Derive and solve quadratic equations by factorization, completing the square and by use of the formula.
15.2	EQUATIONS	Derive and solve simultaneous equations, involving one linear and one quadratic

# EXTENDED MATHEMATICS SCHEME OF WORK

## FORM 4 - TERM 2

WEEK	TOPIC	TOPIC DETAILS
1.1	COORDINATE GEOMETRY	Find the gradient of a straight line Calculate the gradient of a straight line from the coordinates of two points on it.
1.2	COORDINATE GEOMETRY	Find the gradient of parallel and perpendicular lines, . Find the gradient of a line parallel or perpendicular to a given line
1.3	COORDINATE GEOMETRY	Find the equation of a line parallel to another line that passes through a point. Find the equation of a line perpendicular to a line passing through two points Calculate the length and the coordinates of the midpoint of a straight line from the coordinates of its end points.
1.4	COORDINATE GEOMETRY	Interpret and obtain the equation of a straight line graph in the form $y=mx+c$ . Problems will involve finding the equation where the graph is given. Determine the equation of a straight line parallel to a given line. e.g. find the equation of a line parallel to $y = 4x - 1$ that passes through $(0, -3)$
2.1	LINEAR INEQUALITIES	Derive and solve linear inequalities, including representing and interpreting inequalities on a number line; interpretation of results may be required.
3.1	STRAIGHT LINE GRAPHS	Drawing straight line graphs
4.1	LINEAR PROGRAMMING	Represent inequalities graphically and use this representation to solve simple linear programming problems.
4.2	LINEAR PROGRAMMING	The conventions of using broken lines for strict inequalities and shading unwanted regions will be expected.
5.1	DIRECT AND INVERSE PROPORTION	Express direct and inverse proportion in algebraic terms and use this form of expression to find unknown quantities

WEEK	TOPIC	TOPIC DETAILS
6.1	FUNCTIONS	Evaluating functions
6.2	FUNCTIONS	Find inverse functions $f^{-1}(x)$ .
6.3	FUNCTIONS	Form composite functions as defined by $gf(x) = g(f(x))$ .
7.1	GRAPHS IN PRACTICAL SITUATIONS	Interpret and use graphs in practical situations including travel graphs and conversion graphs, e.g. interpret the gradient of a straight-line graph as a rate of change.
7.2	GRAPHS IN PRACTICAL SITUATIONS	Apply the idea of rate of change to simple kinematics involving distance-time and speed-time graphs, acceleration and deceleration; may include estimation and interpretation of the gradient of a tangent at a point
8.1	PROBABILITY	Calculate the probability of a single event as either a fraction, decimal or percentage. Understand and use the probability scale from 0 to 1.
8.2	PROBABILITY	Understand that the probability of an event occurring = 1 - the probability of the event not occurring.
8.3	PROBABILITY	Understand relative frequency as an estimate of probability.
9.1	MID- YEAR EXAMS	MID- YEAR EXAMS
10.1	MID- YEAR EXAMS	MID- YEAR EXAMS
11.1	PROBABILITY	Expected frequency of occurrences.
11.2	PROBABILITY	Calculate the probability of simple combined events, using possibility diagrams, tree diagrams and Venn diagrams
11.3	PROBABILITY	Calculate conditional probability using Venn diagrams, tree diagrams and tables.
12.1	TRIGONOMETRY	Apply Pythagoras' theorem and the sine, cosine and tangent ratios for acute angles to the calculation of a side or of an angle of a right-angled triangle.

<b>WEEK</b>	<b>TOPIC</b>	<b>TOPIC DETAILS</b>
12.2	TRIGONOMETRY	Solve trigonometric problems in two dimensions involving angles of elevation and depression. Know that the perpendicular distance from a point to a line is the shortest distance to the line
13.1	TRIGONOMETRY	Recognise, sketch and interpret graphs of simple trigonometric functions.
13.2	TRIGONOMETRY	Graph and know the properties of trigonometric functions.

# EXTENDED MATHEMATICS SCHEME OF WORK

## FORM 4 - TERM 3

WEEK	TOPIC	TOPIC DETAILS
1.1	SINE & COSINE RULE	Solve problems using the sine and cosine rules for any triangle and the formula area of triangle $=\frac{1}{2}ab \sin C$
1.2	SINE & COSINE RULE	Graph and know the properties of trigonometric functions.
2.1	SINE & COSINE RULE	Solve simple trigonometric equations for values between $0^\circ$ and $360^\circ$ .
3.1	BEARING	Interpret and use three-figure bearings
3.2	BEARING	Recognise, sketch and interpret graphs of simple trigonometric functions.
3.3	BEARING	Solve simple trigonometric equations for values between $0^\circ$ and $360^\circ$ .
4.1	MONEY	Calculate using money and convert from one currency to another
5.1	PERCENTAGES	Calculate a given percentage of a quantity.
5.2	PERCENTAGES	Express one quantity as a percentage of another
5.3	PERCENTAGES	Calculate percentage increase or decrease.
5.4	PERCENTAGES	Carry out calculations involving reverse percentages, e.g. finding the cost price given the selling price and the percentage profit and loss
6.1	SIMPLE AND COMPOUND INTEREST	Use given data to solve problems on personal and household finance involving earnings, simple interest and compound interest. Includes discount, profit and loss. Knowledge of compound interest formula is required.
6.2	SIMPLE AND COMPOUND INTEREST	Extract data from tables and charts.

<b>WEEK</b>	<b>TOPIC</b>	<b>TOPIC DETAILS</b>
6.3	SIMPLE AND COMPOUND INTEREST	Use exponential growth and decay in relation to population and finance, e.g. depreciation, growth of bacteria
7.1	GEOMETRY	Use and interpret the geometrical terms: point, line, parallel, bearing, right angle, acute, obtuse and reflex angles, perpendicular, similarity and congruence
7.2	GEOMETRY	Use and interpret vocabulary of triangles, quadrilaterals, circles, polygons and simple solid figures including nets.
7.3	GEOMETRY	Measure and draw lines and angles.
7.4	GEOMETRY	Construct a triangle given the three sides using a ruler and a pair of compasses only. Read and make scale drawings
8.1	SIMILARITY	Scale factor
8.2	SIMILARITY	Calculate lengths of similar figures.
8.3	SIMILARITY	Recognise congruent shapes.
8.4	SIMILARITY	Areas of similar shapes Volumes of similar shapes