Nendrum College
COMBER

MATHEMATICS DEPARTMENT

Learning Checklist

GCSE Higher (Units M3 and M4)

Topic 1: Algebra

You should be able to…

UNIT M3	
	factorise quadratic expressions of the form $x^2 + bx + c$
	factorise using the difference of two squares
	add or subtract algebraic fractions, for example simplify $\frac{4a+3}{10} + \frac{6a-5}{5}$
	simplify, multiply and divide algebraic fractions with linear or quadratic numerators and denominators
	set up and solve linear equations of the form $\frac{4a+3}{10} + \frac{6a-5}{5} = \frac{13}{2}$
	set up and solve quadratic equations using factors

UNIT M4	
	factorise quadratic expressions of the form ax2+bx+c
	add or subtract algebraic fractions with linear denominators, for example simplify $\frac{2}{x+2} + \frac{3}{2x-1}$
	set up and solve equations such as $\frac{2}{x+2} + \frac{3}{2x-1} = 1$
	set up and solve quadratic equations using factors and the formula, where the coefficient of $x^2 \neq 1$ and more complex equations

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Topic 2: Co-ordinate Geometry

You should be able to…

UNIT M3	
	understand that the form y = mx +c represents a straight line and that m is the gradient of the line and c is the value of the y intercept
	find the equation of a line through two given points or through one point with a given gradient
	understand and use the gradients of parallel lines

UNIT M4	
	understand the use the gradients of perpendicular lines

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Topic 3: Geometry and Measure

You should be able to…

UNIT M3	
	identify and apply circle definitions and properties, including tangent, arc, sector and segment
	solve mensuration problems that involve arc length and area of a sector and surface area and volume of a cylinder, cone or sphere
	understand and use the trigonometric ratios of sine, cosine and tangent to solve 2D problems, including those involving angles of elevation and depression
	use compound measures and units such as pressure and N/m2

UNIT M4	
	solve more complex mensuration problems, for example frustums
	understand and use circle theorems

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Topic 4: Number Work

You should be able to…

UNIT M3	
	find the LCM and HCF of numbers written as the product of their prime factors
	find the original quantity, given the result of a proportional change
	calculate the upper and lower bounds in calculations involving addition and multiplication of numbers expressed to a given degree of accuracy

UNIT M4	
	calculate the upper and lower bounds in calculations involving subtraction and division of numbers expressed to a given degree of accuracy

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Topic 5: Data Handling

You should be able to…

UNIT M3	
	construct and interpret cumulative frequency tables and the cumulative frequency curve
	calculate quartiles and inter-quartile range from ungrouped data and understand their uses
	estimate the median, quartiles and interquartile range;
	display information using box plots
	infer properties of populations or distributions from a sample and know the limitations of doing so

UNIT M4	
	understand and use stratified sampling techniques
	construct and interpret histograms for grouped continuous data with unequal class intervals

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Learning Checklists

GCSE Mathematics
Units M3 & M4

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