Core 2 Key Skills Checklist

How confident are you with each topic? √ *confident* – *not very sure* × *very unsure*

Chapter 1: Indices	
Use rules for multiplying and dividing numbers with indices.	
Manipulate expressions such as $(x^a)^b$.	
Interpret negative powers and perform calculations with them.	
Interpret fractional powers and perform calculations with them.	
Combine index rules to solve equations.	

Chapter 2: Further differentiation	
Recall and apply basic differentiation knowledge from C1.	
Rewrite expressions in index form in order to differentiate.	
Recall and use conditions for stationary points, including use of the second derivative to determine the nature of a stationary point.	
Use differentiation techniques to solve optimisation problems.	

Chapter 3: Further integration and the trapezium rule	
Simplify expressions by multiplying out brackets and manipulating indices.	
Apply integration techniques from C1 and extend to more complex expressions involving negative and fractional indices.	
Use definite integration between limits to calculate the area under a curve.	
Accurately apply the trapezium rule, as given in the formula book, to generate an estimate for the area under a curve, and be able to explain how it works.	

Chapter 4: Basic trigonometry	
Produce from memory the graphs of sin, cos and tan, including details of any crossing points, maxima and minima, and any asymptotes.	
Understand the concept of principle values when dealing with inverse trigonometric functions.	
Find all solutions (within a given range) to a simple trigonometrical equation by using the symmetry and periodicity of the graphs.	
Recall and apply the extended sine rule (including the radius of the circumcircle), taking into account the ambiguous case where necessary.	
Recall and apply the cosine rule for calculating either an unknown side or angle.	
Use the trigonometric formula for the area of a triangle where appropriate.	

Chapter 5: Simple transformations of graphs	
Interpret or apply vertical translations to a function both algebraically and graphically.	
Interpret or apply horizontal translations to a function.	
Interpret or apply vertical stretches to a function.	
Interpret or apply horizontal stretches to a function.	
Interpret or apply reflections in both the x and y axes to a function.	
Deal with compound transformations such as a translation in both the x and y directions, or a translation followed by a stretch.	

Chapter 6: Solving trigonometrical equations	
Solve trigonometrical equations of the form $\cos(kx) = c$ by modifying the range, finding primary solutions and then using the graph to find all solutions in the range.	
Solve trigonometrical equations of the form $\cos(x + k) = c$ in a similar way.	
Recall and apply the identity $\sin^2 \theta + \cos^2 \theta = 1$, rearranging as necessary to solve equations or prove trigonometrical identities.	
Recall and apply the identity $\tan \theta = \frac{\sin \theta}{\cos \theta}$ for solving equations and proving identities.	

Chapter 7: Factorials and binomial expansions	
Recognise and use the factorial function $n!$ in the context of binomial expansions.	
Expand brackets with positive integer powers using Pascal's Triangle to determine coefficients.	
Expand brackets with positive integer powers using the $\binom{n}{r}$ notation and a calculator. (see binomial expansion formula in formula book).	
Modify expansions appropriately by substituting different values for x.	
Determine any given coefficient of an expansion by taking into account both the $\binom{n}{r}$ term and the components of the bracket.	

Chapter 8: Sequences and series	
Define an arithmetic sequence and an arithmetic series.	
Use and understand common notation for first term, common difference and n^{th} term.	
Apply the formula $\frac{n}{2}(n+1)$ effectively to calculate the sum of a sequence of consecutive natural numbers.	
Understand and apply the formulae (given in the formula book) for the nth term and the sum of the first n terms of an arithmetic series.	
Solve simultaneous equations to determine the values of a and d where appropriate.	
Recognise and use sigma notation (Σ) to describe and calculate sums.	
Use inductive formulae to generate sequences and, where applicable, determine the limit of convergent sequences.	

Chapter 9: Radian measure	
Recall the definition of a radian, and be able to convert between degrees and radians (note: knowing common angles such as $30° = \frac{\pi^c}{6}$ is very useful).	
Know and use the simplified formulae for arc length and sector area.	
Find the area of a segment by incorporating sector area and area of a triangle formulae.	

Chapter 10: Further trigonometry with radians	
Accurately sketch trigonometric graphs using radians, noting any crossing points, maxima and minima and asymptotes.	
Solve trigonometrical equations in the form given in Chapter 6, but in radians.	

Chapter 11: Exponentials and logarithms	
Sketch both the exponential curve and its inverse function, the logarithmic curve, noting any crossing points and asymptotes.	
Be able to quickly convert between the logarithmic form $\log_p q = r$ and the exponential form $x^y = z$, identifying the numbers described as the base and the exponent in each.	
Interpret simple logarithms such as $\log_{10} 0.01$ or $\log_2 8$ intuitively and recall results such as the value of $\log_a a$ and $\log_a 1$ and $\log_a 0$.	
Recall and apply the laws of logarithms in order to simplify expressions or solve equations.	
Apply logs to equations where the unknown is in the exponent.	
Convert between different bases by applying the log rules and rearranging appropriately.	

Chapter 12: Geometric series	
Understand the concept of a geometric series and understand and use the notation a, r, U_n, and S_n.	
Accurately apply the formulae (given in the formula book) for the nth term and the sum of the first n terms.	
Solve simultaneous equations using division to determine the values of a and r.	
Use logarithms to solve equations involving an unknown value for n.	
Understand the concept of a sum to infinity, and accurately apply the formula (given in the formula book) for S_∞.	