The Sutton Academy

Knowledge Rich Curriculum Plan

Year 12 Maths

Unit 13 - Integration

Maths Year 12	Unit: Integration			
Lesson/Learning Sequence	**Intended Knowledge:** *Students will know that…*	**Tiered Vocabulary**	**Prior Knowledge:** *In order to know this students, need to already know that…*	**Assessment**
Lesson 69: Integrating/Indefinite integrals Lesson Objective: To learn how to integrate expressions.	• Students will know that integration is the reverse process of differentiation. • Students will know to integrate by adding one to the power and then dividing by the new power. • Students will know how to integrate a constant. • Students will know how to integrate expressions with coefficients. • Students will know how to integrate multiple terms by integrating each term separately. • Students will know that integration can only be done when a term is simplified to a single power of x. • Students will know to add in the constant of integrating whenever an integration takes place unless given limits. • Students will understand integration notation.		• *Students need to know how to manipulate algebraic terms using index laws.* • *Students need to know how to differentiate expressions.* • *Students need to know that when you differentiate constants they disappear.* • *Students need to know how to expand brackets.*	
Lesson 70: Finding functions Lesson Objective: To learn how to how to find the constant of integration.	• Students will know how to find the constant of integration when given any point that the curve passes through. • Students will know to integrate the function, substitute the x- and y-coordinates and solve to find c.		• *Students need to know how to integrate functions with multiple terms.* • *Students need to know why the constant of integration is used.* • *Students need to know how to use substitution.* • *Students need to know how to rearrange formulae.* • *Students need to know how to solve equations.* • *Students need to know how to differentiate expressions.* • *Students need to know how to use index laws to simplify expressions.* • *Students need to know to only integrate when each term is being expressed as a single power of x.* • *Students need to know how to collect like terms.*	
Lesson 71: Definite integrals Lesson Objective: To learn how to find a definite integral.	• Students will know that a definite integral is when you calculate an integral between two limits. • Students will know that a definite integral usually produces a value whereas an indefinite integral always produces a function. • Students will know how to use the correct notation for each stage of the process.		• *Students need to know how to integrate functions with multiple terms.* • *Students need to know how to use index laws to simplify expressions.* • *Students need to know that integration can only happen when each of the terms are written as a single power of x.* • *Students need to know how to use substitution.*	

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	• Students will know how to write a statement of integration with limits. • Students will know that the constant of integration is not needed when limits are known. • Students will know to integrate, then substitute in the limits and find the difference between the answers. • Students will know that all solutions to indefinite integrals are positive because it represents an area.		• *Students need to know how to use the order of operations.*	
Lesson 72: Areas under curves Lesson Objective: To learn how to find the area under a curve.	• Students will know that definite integration can be used to find the area under a curve. • Students will know how to use the definite integral to find the area under a curve by integrating the function, substituting in the limits and finding the difference between them. • Students will know that areas below the curve but above the x-axis are always positive. • Students will know how to identify the area to find by sketching the graph and using the limits.		• *Students need to know how to integrate functions with multiple terms.* • *Students need to know how to find definite integrals.* • *Students need to know that a constant of integration is not needed when limits are known.* • *Students need to know how to use substitution.* • *Students need to know how to sketch quadratic and cubic graphs.* • *Students need to know that areas are positive.* • *Students need to know how to factorise expressions.* • *Students need to know how to solve quadratic and cubic equations.*	
Lesson 73: Areas under the x-axis Lesson Objective: To learn how to find the area bounded by a curve and is below the x-axis.	• Students will know that an area below the x-axis will produce a negative answer. • Students will know to change the negative answer to a positive solution of the area. • Students will know how to find the area total area when parts of the area are above the x-axis and part of the area are below the x-axis. • Students will know that all area solutions should be positive.		• *Students need to know how to find the area under a curve.* • *Students need to know how to find the area bounded by a curve above the x-axis.* • *Students need to know how to integrate functions with multiple terms.* • *Students need to know how to sketch cubic graphs.* • *Students need to know how to factorise expressions.* • *Students need to know how to solve quadratic and cubic equations.* • *Students need to know how to use substitution.* • *Students need to know how to find compound areas.*	

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Lesson/Learning Sequence	**Intended Knowledge:** *Students will know that…*	**Tiered Vocabulary**	**Prior Knowledge:** *In order to know this students, need to already know that…*	**Assessment**
			• *Students need to know how to find the definite integral using limits.*	
Lesson 74: Areas between curves and lines Lesson Objective: To learn how to find the area bounded by curves and lines.	• Students will know how to use definite integration together with areas of trapeziums and triangles to find more complicated areas on graphs. • Students will know how to identify possible shapes and areas on graphs to find the area needed.		• *Students need to know how to integrate functions with multiple terms.* • *Students need to know how to use substitution.* • *Students need to know how to use simultaneous equations to find the points of intersection.* • *Students need to know how to find the area under a curve.* • *Students need to know how to find the area bounded by a curve above the x-axis.* • *Students need to know how to find the area bounded by a curve below the x-axis.* • *Students need to know how to find the total area when parts of the area are above the x-axis and part of the area is below the x-axis.* • *Students need to know how to sketch quadratic and cubic graphs.* • *Students need to know how to solve quadratic and cubic equations.* • *Students need to know how to factorise expressions.* • *Students need to know how to find the areas of rectangles, triangles and trapeziums.* • *Students need to know how to find compound areas.*	