Knowledge Rich Curriculum Plan

Year 12 Maths

Unit 4 - Graphs and transformations

Maths Year 12	Unit: Graphs and transformations			
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 15: Cubic graphs Lesson Objective: To learn how to draw cubic graphs.	• Students will know the basic shape of a positive cubic graph. • Students will know the basic shape of a negative cubic graph. • Students will know how to factorise simple cubic equations. • Students will know how to find where the cubic graph crosses the x-axis. • Students will know how to find where the cubic graph crosses the y-axis. • Students will know that a repeated root will touch the x-axis but not pass through it. • Students will know how to check what happens to y for large and negative values of x. • Students will know how to sketch cubic graphs.		• *Students need to know how to factorsie quadratic expressions.* • *Students need to know how to solve quadratic equations.* • *Students need to know how to draw quadratic functions.* • *Students need to know how to draw a cubic graph using a table values of x and substituting them into the cubic equation.* • *Students need to know the basic shape of a cubic graph.*	
Lesson 16: Quartic graphs Lesson Objective: To learn how to draw quartic graphs.	• Students will know the basic possible shapes for a positive quartic graph. • Students will know the basic possible shapes for a negative quartic graph. • Students will know how to find where the quartic graph crosses the x-axis. • Students will know how to find where the quartic graph crosses the y-axis. • Students will know that a double repeated root will touch the x-axis at each point but not pass through it. • Students will know how to check what happens to y for large and negative values of x. • Students will know how to sketch a quartic graph.		• *Students need to know how factorise quadratic expressions.* • *Students need to know how to solve quadratic equations.* • *Students need to know how to draw quadratic graphs.* • *Students need to know how factorise basic cubic expressions.* • *Students need to know how to solve basic cubic equations.* • *Students need to know how to draw cubic graphs.*	
Lesson 17: Reciprocal graphs Lesson Objective: To learn how to draw reciprocal graphs.	• Students will know the basic shape of a positive reciprocal graph. • Students will know the basic shape of a negative reciprocal graph. • Students will know the basic shape of a positive reciprocal graph involving x^2. • Students will know the basic shape of a negative reciprocal graph involving x^2. • Students will know how to draw a reciprocal graph. • Students will know how to draw a reciprocal graph involving x^2.		• *Students need to know the basic shape a reciprocal graph.* • *Students need to know to draw a reciprocal graph using a table of values of x and substituting them into the reciprocal equation.* • *Students will need to know how to sketch quadratic graphs.*	

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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 will know that the asymptote is a line which the graph approaches but never reaches. • Students will know where the asymptotes are on each reciprocal graph. • Students will know what happens to the graph when the value for x gets bigger or smaller.			
Lesson 18: Points of intersection Lesson Objective: To learn how to sketch curves of functions to find points of intersection.	• Students will know how to sketch curves of functions to show points of intersection. • Students will know how to sketch curves of functions to find the points of intersection. • Students will know how to find the number of real solutions		• *Students need to know how to factorise quadratic expressions.* • *Students need to solve quadratic equations.* • *Students need to know how to sketch quadratic graphs.* • *Students need to know how to factorise basic cubic expressions.* • *Students need to know how to solve cubic equations.* • *Students need to know how to sketch cubic graphs.* • *Students need to know how to solve quartic graphs.* • *Students need to know how to sketch quartic graphs.* • *Students need to know how to sketch reciprocal graphs.* • *Students need to know how solve simultaneous equations.* • *Students need to know how to solve quadratic simultaneous equations.*	
Lesson 19: Translating graphs Lesson Objective: To learn how to translate graphs.	• Students will know that translation means moving a graph left, right, up or down. • Students will know how to translate a graph vertically. • Students will know to translate a graph vertically when adding or subtracting a constant 'outside' the function. • Students will know how to translate a graph horizontally. • Students will know to translate a graph horizontally when adding or subtracting a constant 'inside' the function. • Students will know how to translate asymptotes.		• *Students need to know how to solve a quadratic equation.* • *Students need to know how to sketch a quadratic graph.* • *Students need to know how to solve a cubic equation.* • *Students need to know how to sketch a cubic graph.* • *Students need to know how to solve a quartic equation.*	

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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 will know how to write the translations in vector form.		• *Students need to know how to sketch a quartic graph.* • *Students need to know how to sketch a reciprocal graph.* • *Students need to know how to translate 2D shapes.* • *Students need to know how to use column vectors to translate 2D shapes.*	
Lesson 20: Stretching and reflecting graphs Lesson Objective: To learn how to stretch and reflect different types of graphs.	• Students will know that stretching a graph is a form of enlargement. • Students will know how to stretch a graph in the vertical direction. • Students will know to stretch a graph in the vertical direction when a constant is multiplying the 'outside' of the function. • Students will know that the scale factor will match the constant that is multiplying the 'outside' of the function. • Students will know how to stretch a graph in the horizontal direction. • Students will know to stretch a graph in the horizontal direction when a constant is multiplying 'inside' the function. • Students will know that the scale factor is the reciprocal of the constant multiplying the 'inside' of the function. • Students will know how to reflect a graph in the x-axis. • Students will know to reflect a graph in the x-axis when the 'outside' of the function is being multiplied by -1. • Students will know how to reflect a graph in the y-axis. • Students will know to reflect a graph in the y-axis when the 'inside' of the function is being multiplied by -1. • Students will know how to identify different types of transformations of graphs.		• *Students need to know how to factorise quadratic expressions.* • *Students need to know how to solve quadratic equations.* • *Students need to know how to sketch quadratic graphs.* • *Students need to know how to solve cubic equations.* • *Students need to know how to sketch cubic graphs.* • *Students need to know how to sketch quartic graphs.* • *Students need to know how to sketch reciprocal graphs.* • *Students need to know how to enlarge 2D shapes.* • *Students need to know how to use a scale factor to enlarge 2D shapes.* • *Students need to know how to reflect 2D shapes.*	

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Lesson 21: Transforming functions Lesson Objective: To learn how to translate, stretch and reflect functions.	• Students will know how to apply translations to an unfamiliar function. • Students will know how to stretch an unfamiliar function. • Students will know how to reflect an unfamiliar function. • Students will know how to identify the type of transformation - translation, stretch or reflection. • Students will know how to use specific points and features of a function to transform it.		• *Students need to know how to translate a graph.* • *Students need to know how to stretch a graph.* • *Students need to know how to reflect a graph.* • *Students need to know how to transform asymptotes.* • *Students need to know how to recognise and identify different types of transformation - translation, stretch or reflection.*	