



The Sutton Academy

# Knowledge Rich Curriculum Plan

Course/Unit



Lesson/Learning Sequence	Intended Knowledge: <i>Students will know that...</i>	Tiered Vocabulary	Prior Knowledge: <i>In order to know this students, need to already know that...</i>	Assessment
<p><b>To learn how to calculate and sketch basic modulus functions.</b></p>	<ul style="list-style-type: none"> <li>• <i>Students will know that the modulus of a number <math>a</math>, written as <math> a </math>, is its non-negative numerical value.</i></li> <li>• <i>Students will know that the modulus function is also known as the absolute value function and on a calculator the button is often labelled 'Abs'.</i></li> <li>• <i>Students will know that a modulus function is represent by <math> f(x) =f(x)</math> when the function is greater than or equal to zero.</i></li> <li>• <i>Students will know that a modulus function is represent by <math> f(x) =-f(x)</math> when the function is less than zero.</i></li> </ul>		<p>Students need to know how to use substitution.            Students need to know how to add and subtract fractions.            Students need to know how to use the order of operations.            Students need to know how to draw straight line graphs.            Students need to know how to manipulate negative numbers.            Students need to know how to substitute into functions.            Students need to understand what a function is..</p>	
<p><b>To learn how to solve and sketch complex equations and inequalities involving modulus functions.</b></p>	<ul style="list-style-type: none"> <li>• <i>Students will know how to sketch graphs in the format of <math> ax+b =c</math> by first sketching the graphs of <math>y=ax+b</math> and <math>y=c</math> and finding the points of intersection.</i></li> <li>• <i>Students will know that the function inside the modulus is called the argument of the modulus.</i></li> <li>• <i>Students will know how to solve modulus equations algebraically by considering the positive argument and the negative argument separately.</i></li> <li>• <i>Students will know how to solve inequalities involving modulus functions by solving and finding which parts of the graph satisfy the inequality.</i></li> </ul>		<p><i>Students need to know how to solve simultaneous equations.</i>  <i>Students need to know how to solve linear equations.</i>  <i>Students need to know to calculate the modulus function of numbers.</i>  <i>Students need to know what a modulus function is.</i>  <i>Students need to know how to sketch a modulus function.</i>  <i>Students need to know how to draw straight line graphs.</i>  <i>Students need to know how to solve linear inequalities.</i>  <i>Student need to know how to sketch and highlight an inequality on a graph..</i></p>	
<p><b>To learn how to find the domain and range of functions..</b></p>	<ul style="list-style-type: none"> <li>• <i>Students will know a mapping transforms one set of numbers into a different set of numbers.</i></li> <li>• <i>Students will know how to described a mapping in words, through an algebraic equation or represented by a graph.</i></li> <li>• <i>Students will know that a mapping is a function if every input has a distinct output.</i></li> <li>• <i>Students will know how to identify if a mapping could represent a function.</i></li> <li>• <i>Students will know how to identify if functions are one-to-one or many-to-one.</i></li> <li>• <i>Students will know that the domain is the set of all possible inputs for a mapping.</i></li> <li>• <i>Students will know how to find the domain of a function.</i></li> <li>• <i>Students will know that the range is the set of all possible outputs for the mapping.</i></li> <li>• <i>Students will know how to find the range of a function.</i></li> <li>• <i>Students will know how to use a piecewise-defined function which is a function that consists of two parts which are typically made up of one linear function and one quadratic function.</i></li> <li>• <i>Students will know how to sketch a piecewise-defined function and use it to find the range of the function.</i></li> <li>• <i>Students will know how to solve a piecewise-defined function.</i></li> </ul>		<p><i>Students need to know how to solve linear and quadratic equations.</i>  <i>Students need to know how to rearrange formulae.</i>  <i>Students need to know how to substitute into functions.</i>  <i>Students need to know how to sketch functions.</i>  <i>Students need to know how to draw straight line graphs.</i>  <i>Students need to know how to draw quadratic and cubic graphs.</i>  <i>Students need to know how to solve functions.</i>  <i>Students need to know how to use functions involving inequalities.</i></p>	
<p><b>To learn how to find and use composite functions.</b></p>	<ul style="list-style-type: none"> <li>• <i>Students will know that two or more functions can be combined to make a new function called a composite function.</i></li> <li>• <i>Students will know that <math>fg(x)</math> means apply <math>g</math> first, then apply <math>f</math>.</i></li> <li>• <i>Students will know how to substitute values into composite functions.</i></li> <li>• <i>Students will know how to combine functions into a composite function, <math>fg(x)</math> by mapping <math>g</math> on <math>x</math> first and then mapping <math>f</math> onto the result.</i></li> <li>• <i>Students will know how to find a composite function involving a modulus function.</i></li> </ul>		<p><i>Students need to know how to substitute into functions and expressions.</i>  <i>Students need to know how to solve functions and equations.</i>  <i>Students need to know how to sketch functions.</i>  <i>Students need to know how to rearrange formulae.</i>  <i>Students need to know function notation.</i></p>	

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	<ul style="list-style-type: none"> <li>Students will know how to solve composite functions.</li> <li>Students will know how to sketch composite functions.</li> </ul>			
<b>To learn how to find inverse functions.</b>	<ul style="list-style-type: none"> <li>Students will know that the inverse of a function performs the opposite operation to the original function.</li> <li>Students will know that the domain of a function will be the range of its inverse function.</li> <li>Students will know that the range of a function will be the domain of its inverse function.</li> <li>Students will know that the function and its inverse function are reflections of each other in <math>y=x</math>.</li> <li>Students will know that inverse functions can only exist for one-to-one functions.</li> <li>Students will know how to find the inverse of a function by equating the function to <math>y</math> and rearranging to make <math>x</math> the subject.</li> <li>Students will know how to find the domain or range of an inverse function.</li> <li>Students will know how to sketch the graph of an inverse function.</li> <li>Students will know how to solve equations involving an inverse function.</li> </ul>		<p><i>Students need to know how to rearrange formulae.</i></p> <p><i>Students need to know how to solve functions and equations.</i></p> <p><i>Students need to know how to substitute into functions and expressions.</i></p> <p><i>Students need to know how to sketch graphs of functions.</i></p> <p><i>Students need to know how to use set notation.</i></p> <p><i>Students need to know how to find composite functions.</i></p> <p><i>Students need to know function notation.</i></p>	
<b>To learn how to sketch the graphs of <math>y= f(x) </math> and <math>y=f( x )</math>.</b>	<ul style="list-style-type: none"> <li>Students will know how to sketch the graph of <math>y= f(x) </math> by sketching the graph of <math>y=f(x)</math>, reflecting any parts below the <math>x</math>-axis and delete the parts reflected.</li> <li>Students will know how to sketch the graph of <math>y=f( x )</math> by sketching the graph of <math>y=f(x)</math> and reflecting this in the <math>y</math>-axis.</li> <li>Students will know the differences between <math>y= f(x) </math> and <math>y=f( x )</math>.</li> </ul>		<p>Students need to know how to sketch graphs of functions.</p> <p>Students need to know how to sketch sine and cosine graphs.</p> <p>Students need to know how to sketch quadratic, cubic and quartic graphs.</p> <p>Students need to know how to reflect graphs.</p> <p>Students need to know how to substitute values into functions.</p>	
<b>To learn how to use combinations of transformations on functions.</b>	<p>Students will know how to translate a modulo function.</p> <p>Students will know how to use a mixture of transformations on the graph of a function.</p>		<p>Students need to know how to translate a graph in the <math>x</math> or <math>y</math> direction.</p> <p>Students need to know how to reflect a graph in the <math>x</math>- or <math>y</math>-axis.</p> <p>Students need to know how to stretch a graph horizontally or vertically with a given scale factor.</p> <p>Students need to know how to recognise different transformations of a function in algebraic form.</p> <p>Students need to know how to sketch the graphs of functions.</p>	

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<p><b>To learn how to solve modulus problems.</b></p>	<p>Students will know how to use combinations of transformations to solve problems.            Students will know how to use <math> f(x) </math> and <math>f( x )</math> to solve problems.            Students will know how to use their understanding of domain and range to solve problems.</p>		<p>Students need to know how to transform functions.            Students need to know how to use multiple transformations with functions.            Students need to know how to transform modulus functions.            Students need to know how to find the domain and range of a function.            Students need to know how to draw the graphs of <math>y= f(x) </math> and <math>y=f( x )</math>.            Students need to know how to solve equations involving functions.            Students need to know how to sketch graphs of functions.            Students need to know how to sketch and solve functions involving inequalities.</p>	



<p>Students will know how to use the trapezium rule to approximate integration.</p>	<ul style="list-style-type: none"> <li>• Students will know that if you cannot integrate a function algebraically, you can use a numerical method to approximate the area beneath a curve.</li> <li>• Students will know that to approximate the area given by <math>\int_a^b y dx</math> you can divide the area into <math>n</math> equal strips. Each strip will be of width <math>h</math> where <math>h = \frac{b-a}{n}</math></li> <li>• Students will know that <math>\int_a^b y dx \approx \frac{1}{2}h(y_0 + 2(y_1 + y_2 \dots + y_{n-1}) + y_n)</math> where <math>h = \frac{b-a}{n}</math> and <math>y_i = f(a + ih)</math></li> <li>• Students will know if there answer is an overestimate (convex) or underestimate.</li> </ul>		<p>Students will need to know the area of a trapezium. Students will need to know how to substitute into a formula Students will need to know how to use radians.</p>	
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