



The Sutton Academy

Knowledge Rich Curriculum Plan

A level/ pure/ numerical methods



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
To learn how to locate roots of a function in a given range.	<ul style="list-style-type: none"> Students will know that if the function $f(x)$ is continuous on the interval $[a,b]$ and $f(a)$ and $f(b)$ have opposite signs, then $f(x)$ has at least one root, x, which satisfies $a < x < b$ Students will know how to find a root given a interval. Students will know how to identify roots. 	Tier 2 Continuous – Forming an unbroken whole	Students will need to know how to find a root from the graph. Students will need to know how to substitute into a formula.	
To learn how to use iteration to find approximate solutions for roots of equations.	<ul style="list-style-type: none"> Students will know that to solve an equation of the form $f(x) = x$ by an iterative method, rearrange $f(x) = 0$ into the form $x = g(x)$ and use the iterative formula $x_{n+1} = g(x_n)$ Students will know that not all iterations converge to a root, when an iteration moves away from a root, you say it diverges Students will know that when iterations converge to a root, the resulting graph is sometimes called a cobweb diagram 	Tier 3 – Iteration Repetition of a mathematical procedure	Students will need to know how to rearrange a formula Students will need to know how to substitute into a formula	
To learn how to use the Newton-Raphson method to find solutions to equations.	<ul style="list-style-type: none"> Students will know that the Newton-Raphson formula is $x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$ Students will know that when computing the formula at a turning point, it will fail as $f'(x_n) = 0$ Students will be able to apply the Newton-Raphson formula 		Students will need to know how to differentiate Students will need to know how to use iteration Students will need to know how to substitute into a formula.	
To learn how to model real-life situations using iteration.	<ul style="list-style-type: none"> Students will know how to locate roots in real life situations. Students will know how to use iteration in real life situations. Students will know how to use the Newton-Raphson method in real life situations. 	s	Students will need to know how to differentiate Students will need to know how to use iteration Students will need to know how to substitute into a formula. <i>Students will need to know how to find approximate solutions for roots of equations</i> <i>Students will need to know Newton-Raphson method to find solutions to equations</i>	