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| **Literacy**  Newton-Raphson, interval bisection, linear interpolation, convergence, root, approximation. | **Research**  **Numerical Methods Homework**  Research the conditions for convergence of the Newton-Raphson method. How quickly does the method converge? | **Memory**  Numerical methods are used when it is hard (or impossible) to solve a mathematical problem directly. Newton-Raphson, and its generalisations are very popular methods. | | |
| **Skills**   1. Show that the equation has a root in the interval and improve this (i.e. give a narrower interval). 2. Show that a root of the equation has a root in the interval . Use linear interpolation to find this root correct to 2 decimal places. 3. Use interval bisection to find, correct to 2 decimal places, the root of the equation that lies in the interval . 4. For the equation,. Let and use the Newton-Raphson process to find a better approximation. 5. Find correct to 1 decimal place, the real root of by using the Newton-Raphson process. | | | **Stretch**  Using the same axes draw accurate graphs of and in the interval . Deduce that the equation has a root near 2.2.  Obtain alternative approximations to the root of the equation   1. By linear interpolation between and . 2. By three applications of the Newton-Raphson process using as the initial value. |