|  |  |  |
| --- | --- | --- |
| **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.
 |