Edexcel A level Maths Numerical methods

Section 1: Solving equations numerically

Crucial points

1. **Always sketch a graph**
   A graph helps to give you some idea of the location of any roots, and also will alert you to possible problems such as discontinuities or repeated roots.

2. **Make sure you state the degree of accuracy of the root**
   You can give the degree of accuracy by looking at the iterations and seeing how many decimal places have been unchanged for two or three iterations. You can then be reasonably confident that the iteration is correct to that number of decimal places. To be certain, check for a change of sign either side of the root you have found.

3. **Use your calculator efficiently**
   Using the ANS key repeatedly means that you don't have to keep typing a formula in, and you can generate a number of iterations very quickly. Make sure you know how to do this.

4. **Make sure the root you have found is the one you wanted**
   Sometimes fixed point iteration converges to a different root to the one you were trying to find. If this happens, try a different starting point, or a different rearrangement. This can also happen with the Newton-Raphson method – if so, try a different starting point.

5. **Use enough decimal places in your working**
   You need to work with more decimal places than you need in your final answer. The best approach is to store each approximation in your calculator, so that you have maximum accuracy at each stage.