**THE NEWTON-RAPHSON METHOD**

**The Newton- Raphson method can be used to find numerical solutions to equations of the form . You need to be able to differentiate in order to use this method.**

**The Newton- Raphson formula is:**

**Example 1**

Recall that in lesson 1 we saw that the function has aroot, , in the interval .

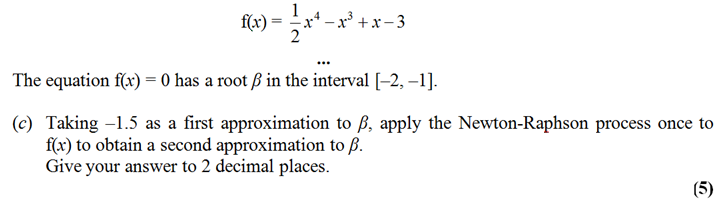
Using as a first approximation to, apply the Newton-Raphson procedure three times to find a better approximation to which, in this case, will be accurate to 7 decimal places.

To perform iterations quickly, do the following on your calculator:

[0.5] [=]

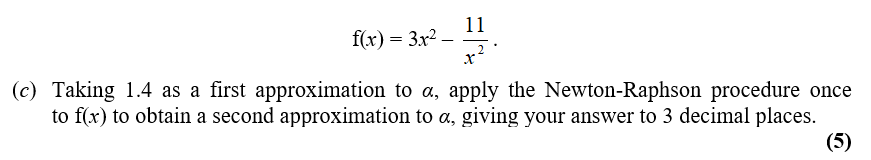
[ANS] – (ANS – cos(ANS))/(1 + sin(ANS))

Then press [=].

**Example 2**

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**Example 3**

**When does Newton-Raphson fail?**

tangent

**If the starting value was the stationary point**, then , resulting in a division by 0 in the above formula.

Graphically, it is because the tangent will never reach the -axis.

Newton-Raphson also suffers from the same drawbacks as solving by iteration, in that it is possible for the values of to **diverge**.

In this example, the oscillate either side of 0, but get gradually further away from .

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