Trial and Improvement
Teacher Notes

Create a new blank document and save it as: **trial.**

Starter Activity

When is $x^2 + 7x + 5 = 0$?

Try a couple of possibilities long hand

     e.g. x =10,   do 10x10 + 7x10 + 5   get 175   no use!

How could improve on this process?

On a new calculator page define the function: $f(x) = x^2 + 7x + 5$

Try $f(10)$, then improve $f(5)$, try more.

Main Activity

Open a new Lists & spreadsheet page.
Type headings for columns A and B for the number to test and the outcome of the test, for example **number** in column A and **test** in column B.
(Use the NavPad to navigate to the cell next to the A, type the word **numbe**r, then press (enter).)

Press **menu/Actions/Resize** and use ▶ on the **NavPad** to increase the width of the column until you can read the whole word. Then press (enter) to confirm. Repeat for column B.

In cell B1 type the function as a spreadsheet formula:
   =a1^2 + 7a1 + 5

Choose **menu/Data/Fill Down**
Press ▾ to create 10 copies of the formula (i.e. down to row 10) and press (enter).
(5 will appear in every cell ... this is the value of f(0)!)

Now you are ready to start finding the roots by trial and improvement.

Navigate to cell A1 and try a first guess and press (enter).

Now enter an improved guess in cell A2 and press (enter).

Students should write down a commentary on how they are choosing their next 'guess' and get more specific as they get close to a solution. This set up gives them exactly 10 opportunities to improve.

Create a new Graphs & Geometry page.
Create a graph of the function:
       type $x^2 + 7x + 5$ into the entry line for f1(x) and press (enter).

Interpret the solution from the first trial and improvement referring to the graph.
Notice that there is a second solution and notice roughly where it is.

Go back to the spreadsheet page. ((ctrl)◀)
Go to cell B10 and use fill down to create a further 10 spaces to find the second root.

Use trial and improvement to find the second root.
Students should describe how they choose the next 'guess' and describe the accuracy of their solutions.

Plenary

When both solutions are found to a suitable level of accuracy, review the function like this.

Create a new Data and Statistics page.

Use the NavPad to navigate to the bottom **click to add a variable** box.

Click in it ((≋)), ensure the list called number is highlighted and press (enter).

Now navigate to the **click to add a variable** box on the left hand side.

Click in it ((≋)), ensure the list called test is highlighted and press (enter).

Discuss the shape of the graph and how it was created.

Use this discussion to review the solutions to roots of the function.