Exercise 5. *Using root-finding calculate* $\sqrt{R}$. *Ofcourse,* MATLAB *has the function* `sqrt` *and also the power function as we saw in the previous lecture. But pretend that it did not. What is* $\sqrt{R}$*? Find a simple function* f *(that doesn't use the square-root function) so that* $f(\sqrt{2}) = 0$. *(There are several options, so if you don't manage with one option, try another!) Find* $\sqrt{2}$ *like a Babylonian*[†]. *How many iterations do you need to get an answer that is 1e-15 from the answer given by* MATLAB[‡]*? Note: this problem will require you to use a pencil and paper. You will need to differentiate, divide and simplify a fraction* before *you type your code in* MATLAB.

Notice that the starting point is important. Find starting points that converge to each of $\pm\sqrt{2}$.

[†]Look at http://en.wikipedia.org/wiki/Methods_of_computing_square_roots. for a reference.

[‡]The notation `1e-15` is legal notation in matlab and it means 1×10^{-15}. Also, with Matlab 1e-16 is the smallest *precision* (not number) possible i.e., `1+1e-16` = `1` (although `1+2e-16` ≠ `1`)

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