

Problem statement a) Enter the number 5 in a calculator showing 10 decimal digits after the decimal point. Press the square root button 20 times. The result will be **1.00000 15348**. Subtract 1 and multiply by 1,048,576 to get **1.60943 91475** *but* the same calculator will declare that $\ln 5$ is **1.60943 79124**. Since 1,048,576 is 2^{20} , this is *not* a coincidence. Explain.

b) Given a positive number, x , outline a strategy for computing $\ln x$ only with the arithmetic operations ($+$, \times , $-$, $/$) and square root ($\sqrt{\quad}$). Your strategy should involve asserting (and verifying) that a certain sequence which can be easily computed with the listed operations always converges to $\ln x$.