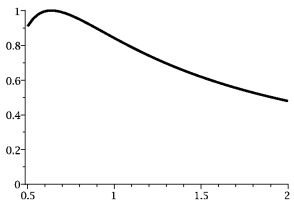
**Problem statement** Consider the function $f(x) = \sin\left(\frac{1}{x}\right)$ with domain $(0, \infty)$ (that is, $x$'s which are *positive*). $f$ is a strange function. A graph of $f$ on the interval $[.5, 2]$ is shown to the right (no strangeness there).




a) Find all $x$ in the domain for which $f(x) = 0$ (there are many!).

b) Find a positive number $A$ so that the interval $[A, .5]$ contains exactly 5 roots of $f(x) = 0$. Explain why this is so, and provide a graph of $f$ on this interval.