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I will be using what applied mathematicians call the *bisection method*. Convergence is very slow (3 1/3 iterations for one more digit of accuracy), but as pure mathematicians we don't care. Sergio used a similar strategy in 2.19.

Given $a < b$, we assume without loss of generality that $f(a) < d < f(b)$.

Let $c_1 = \frac{a+b}{2}$. If $f(c_1) < d$, we set $a_1 = c_1$, $b_1 = b$. If $f(c_1) > d$, we set $a_1 = a$, $b_1 = c_1$. [If $f(c) = d$, it's our lucky day and we are done.]

We let $c_2 = \frac{a_1+b_1}{2}$, and proceed analogously.

In this fashion we obtain an increasing bounded sequence (a_n) ; let's call its limit c . c is also the limit of the decreasing sequence (b_n) .

Note that $f(b_n) > d$ and $f(a_n) < d$ for all n . Continuity implies that $f(c) = d$. (Check that!)

The greater danger for most of us lies not in setting our aim too high and falling short; but in setting our aim too low, and achieving our mark. - Michelangelo Buonarroti



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