1) Choose p_0 - initial approximation
2) Draw the tangent at $(p_0, f(p_0))$
3) This tangent crosses the x-axis at p_1
4) Continue.

3) Examples

#6c/75 Use Newton's method to find solution accurate to within 10^{-5} for the problem

$$(x-2)^2 - \ln x = 0$$

for $1 \le x \le 2$.

Set $f(x) = (x-2)^2 - \ln x$

$f'(x) = 2(x-2) - \frac{1}{x}$

$$p_n = p_{n-1} - \frac{(p_{n-1}-2)^2 - \ln p_{n-1}}{2(p_{n-1}-2) - \frac{1}{p_{n-1}}}$$

Set $p_0 = 1$ (Note $f(1) > 0$, $f(1.5) \approx -0.15 < 0$)

n	p_n	Error $\lvert p_n - p_{n-1} \rvert$
0	1	
1	1.333333333	
2	1.408579272	
3	1.412381564	0.96×10^{-5}
4	1.412391172	

The rest of the iterations are the same ↓