Compare Newton's method with fixed point iteration.

Rewrite $(x-2)^2 - \ln x = 0$ as a fixed point problem

A) $(x-2)^2 = \ln x \longrightarrow x = e^{(x-2)^2}$

$|g'(x)| < |g'(1)| \leq 2e$

n	$g(p_n)$
0	1.5
1	1.2840254 17
2	1.669659317
3	1.115301717
4	2.187350626

← Diverges

n	$g(p_n)$
0	2
1	2.8325546
2	3.0203817

B) $x - 2 = \sqrt{\ln x}$

$x = 2 + \sqrt{\ln x}$ bad because $g'(x)$ is unbounded at $x = 1$

C) $x^2 - 4x + 4 = \ln x$

$$x = \frac{x^2 - \ln x + 4}{4}$$

$$g(x) = \frac{x^2 - \ln x + 4}{4}$$ – increasing $g(1) \leq g(x) \leq g(2)$

$1 < \frac{5}{4} \leq g(x) \leq 2 - \frac{\ln 2}{4} <$

$$g'(x) = \frac{2x - \frac{1}{x}}{4} = \frac{x}{2} - \frac{1}{4x}$$