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

Signe de $2(1-\ln x)$:

$2(1-\ln x) > 0 \iff 1 - \ln x > 0 \iff \ln x < 1 \iff x < e$

Signe de x : $x > 0$

x	0		e		$+\infty$
$2(1-\ln x)$	‖	$+$	ϕ	$-$	
x	‖	$+$		$+$	
f'	‖	$+$	ϕ	$-$	
f	‖	$-\infty$ ↗	$f(e)$	↘ $-\infty$	

$$\lim_{\substack{x \to 0 \\ x > 0}} f(x) = 3 - \infty - \infty = -\infty$$

$$f(e) = 3 + 2 - 1 = 4$$

$$\lim_{x \to +\infty} f(x) = \lim_{x \to +\infty} \left(-(\ln x)^2\right) = -\infty$$