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

$$= \frac{\sqrt{x}(2-\sqrt{x})}{2x\sqrt{x}} = \frac{2-\sqrt{x}}{2x}$$

Signe de f' :

Signe de $2-\sqrt{x}$: $2-\sqrt{x} > 0 \iff \sqrt{x} < 2$

$\iff x < 4$

Signe de $2x$: $2x > 0 \iff x > 0$

x	0		4		$+\infty$
$2-\sqrt{x}$	‖	$+$	0	$-$	
$2x$	‖	$+$		$+$	
f'	‖	$+$	0	$-$	
f	‖ $-\infty$	↗	$f(4)$	↘	$-\infty$

$\lim_{x \to 0} f(x) = -\infty$ $\qquad f(4) = \ln 4 - 2$

$\lim_{x \to +\infty} f(x) = \lim_{x \to +\infty} \sqrt{x}\left(\frac{\ln x}{\sqrt{x}} - 1\right) = +\infty\,(0-1) = -\infty$