Log Properties

Simplify the following expression using log properties.

$$\ln\left(5\cdot\sqrt{\frac{x^2-1}{x^2}}\right)$$

Below on the left is the simplification process. On the right the next algebraic operation is indicated. The next operation is determined which, if any, log property can be used.

$\ln\left(5\cdot\sqrt{\frac{x^2-1}{x^2}}\right)$	$=$	$5\cdot\sqrt{\frac{x^2-1}{x^2}}$	product
$\ln 5+\ln\sqrt{\frac{x^2-1}{x^2}}$	$=$		
$\ln 5+\ln\left(\frac{x^2-1}{x^2}\right)^{\frac{1}{2}}$	$=$	$\left(\frac{x^2-1}{x^2}\right)^{\frac{1}{2}}$	exponent
$\ln 5+\frac{1}{2}\ln\left(\frac{x^2-1}{x^2}\right)$	$=$	$(x^2-1)/(x^2)$	quotient
$\ln 5+\frac{1}{2}\left[\ln(x^2-1)-\ln x^2\right]$	$=$	x^2	exponent
$\ln 5+\frac{1}{2}\left[\ln(x^2-1)-2\ln x\right]$	$=$		
$\ln 5+\frac{1}{2}\left[\ln[(x-1)\cdot(x+1)]-2\ln x\right]$	$=$	$(x-1)\cdot(x+1)$	product
$\ln 5+\frac{1}{2}\left[\ln(x-1)+\ln(x+1)-2\ln x\right].$			