Find the derivative of $\ln(\sqrt{x+2})$

1) First rewrite the function using a rule of logs.

$f(x)=\ln((x+2)^{\frac{1}{2}})$ Rewrite the root using an exponent

$f(x)=\frac{1}{2}\ln(x+2)$ Place the $\frac{1}{2}$ in front of the $\ln(x+2)$

2) Now differentiate using the chain rule.

$f'(x)=\frac{d}{dx}\frac{1}{2}\ln(x+2)$ Setup the derivative

$f'(x)=\frac{1}{2}\frac{d}{dx}\ln(x+2)$ Pull the $\frac{1}{2}$ because it's constant

$f'(x)=\frac{1}{2}\times\frac{1}{x+2}\times\frac{d}{dx}(x+2)$ Apply the chain rule.

$f'(x)=\frac{1}{2}\times\frac{1}{x+2}\times1$ $\frac{d}{dx}(x+2)=1$

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