Common Algebra Mistakes

Fragment: Rules of Logarithms

The Mistake Fragment

Find the algebra mistake:

$$\ln\left(\frac{1}{2}e^{-4x}\right) = \frac{1}{2}\ln\left(e^{-4x}\right)$$

Need a hint? Look carefully at the red part of the algebra:

$$\ln\left(\frac{1}{2}e^{-4x}\right) = \frac{1}{2}\ln\left(e^{-4x}\right)$$

The Correction

$$\ln\left(\frac{1}{2}e^{-4x}\right) = \ln\left(\frac{1}{2}\right) + \ln\left(e^{-4x}\right)$$

An Explanation

A constant multiple cannot be factored out from inside a logarithm (the logarithm is *not* a *linear* function). The correct rule to use is ln(ab) = ln(a) + ln(b).