ICE - Antiderivatives & u-Substitution

- **Find an equation for each of the antiderivatives (or indefinite integrals) given in the table below. In each case, identify the "inside function" (u), calculate the derivative $\frac{du}{dx}$ and rewrite the indefinite integral in terms of u and du.**

Antiderivative (Indefinite integral)	Work and equation for Antiderivative
$\int \ln(x) \cdot \sqrt{x \cdot \ln(x) - x} \cdot dx$	
$\int \left(\frac{-1}{x^2} + 2x \right) \cdot \sqrt{\frac{1}{x} + x^2 + 1} \cdot dx$	

Answers: **(a)** $(2/3)*[x*\ln(x) - x]^{3/2} + C.$ **(b)** $(2/3)*[1/x + x^2 + 1]^{3/2} + C.$
(c) $2*[x*\ln(x)]^{1/2} + C.$ **(d)** $(1/15)*[x + \ln(x)]^{15} + C.$ **(e)** $\ln(\ln(x)) + C.$

Antiderivative (Indefinite integral)	Work and equation for Antiderivative
$\int \left(\ln(x)+1\right) \cdot \dfrac{1}{\sqrt{x \cdot \ln(x)}} \cdot dx$	
$\int \left(\dfrac{x+1}{x}\right) \cdot \left(x + \ln(x)\right)^{14} \cdot dx$	
$\int \dfrac{1}{\ln(x)} \cdot \dfrac{1}{x} \cdot dx$	

Answers: **(a)** $(2/3)*[x*\ln(x) - x]^{3/2} + C.$ **(b)** $(2/3)*[1/x + x^2 + 1]^{3/2} + C.$
(c) $2*[x*\ln(x)]^{1/2} + C.$ **(d)** $(1/15)*[x + \ln(x)]^{15} + C.$ **(e)** $\ln(\ln(x)) + C.$