Integration by parts.

$u(x) := \ln(x) \quad v(x) := x \qquad \frac{d}{dx}u(x) = \frac{1}{x} \qquad V(x) := \frac{x^2}{2}$

$\int_2^3 \ln(x)\cdot x\,dx = 2.307 \qquad \int_2^3 u(x)\cdot v(x)\,dx = 2.307$

==

$\frac{d}{dx}(f(x)\cdot g(x)) = \frac{d}{dx}f(x)\cdot g(x) + f(x)\cdot\frac{d}{dx}g(x)$ The product rule gives....

$f(x)\cdot g(x) = \int \frac{d}{dx}f(x)\cdot g(x)\,dx + \int f(x)\cdot\frac{d}{dx}g(x)\,dx$ The product rule integrated

A B C

$\int f(x)\cdot\frac{d}{dx}g(x)\,dx = f(x)\cdot g(x) -- \int \frac{d}{dx}f(x)\cdot g(x)\,dx$ Solved for the C part

C A B

Let f(x) <=> u(x)

Let g'(x)<=> v(x)

Let g(x)<=> V(x)

$\int u(x)\cdot v(x)\,dx = u(x)\cdot V(x) - \int \frac{d}{dx}u(x)\cdot V(x)\,dx$ so...

$\int_2^3 \ln(x)\cdot x\,dx = u(3)\cdot V(3) - u(2)\cdot V(2) - \int_2^3 \left(\frac{1}{x}\right)\cdot\left(\frac{x^2}{2}\right)dx = 2.307$

Note: Pick u(x) such that it represents the part that has a hard antiderivative.