L - Logarithmic function

I - Inverse Trigonometric functions

A - Algebraic

T - Trigonometric

E - Exponential

Examples.

1) Evalue the following

$\int x \cdot \log x \, dx$.

$\log x$ is Logarithmic function

∴ According to the serial order LIATE first function is $\log x$.

$\int \log x \cdot x \, dx$.

∴ Integration By parts Thm

$$I = \log x \int x\,dx - \int \left[\frac{d}{dx}(\log x) \int x\,dx\right] dx.$$

$$I = \log x \left[\frac{x^2}{2}\right] - \int \left[\frac{1}{x} \int x\,dx\right] dx.$$

$$= \log x \left[\frac{x^2}{2}\right] - \int \left[\frac{1}{x} \frac{x^2}{2}\right] dx$$

$$= \log x \left[\frac{x^2}{2}\right] - \int \left[\frac{x}{2}\right] dx.$$

$$= \frac{x^2}{2} \log x - \frac{1}{2} \int x\,dx$$