

## Answer on Question #71174 – Math – Calculus

### Question

Integrate  $\int x(\ln x)^2 dx$ .

### Solution

We shall apply integration by parts

(see [https://en.wikipedia.org/wiki/Integration\\_by\\_parts](https://en.wikipedia.org/wiki/Integration_by_parts)).

$$\int x(\ln x)^2 dx = \left\{ \begin{array}{l} u = (\ln x)^2, du = \frac{2 \ln x}{x} dx \\ dv = x dx, v = \frac{x^2}{2} \end{array} \right\} = \frac{1}{2} x^2 (\ln x)^2 - \int x \ln x dx =$$
$$= \left\{ \begin{array}{l} u = \ln x, du = \frac{dx}{x} \\ dv = x dx, v = \frac{x^2}{2} \end{array} \right\} = \frac{1}{2} x^2 (\ln x)^2 - \frac{1}{2} x^2 \ln x + \int \frac{x}{2} dx = \frac{1}{2} x^2 (\ln x)^2 - \frac{1}{2} x^2 \ln x + \frac{x^2}{4} + c.$$

**Answer:**  $\frac{1}{2} x^2 (\ln x)^2 - \frac{1}{2} x^2 \ln x + \frac{x^2}{4} + c.$