

Monday - January 11, 2016

$$\textcircled{20} \int \frac{1}{x \ln(x^3)} dx = \frac{1}{3} \int \frac{1}{x} \cdot \frac{3x^2}{x^2} \cdot \frac{1}{\ln(u)} dx$$

$$u = x^3 \\ du = 3x^2 dx = \frac{1}{3} \int \frac{1}{u} \cdot \frac{1}{\ln(u)} du$$

$$\begin{aligned} v = \ln(u) \\ dv = \frac{1}{u} du &= \frac{1}{3} \int \frac{1}{v} dv \end{aligned}$$

$$= \frac{1}{3} \ln|v| + c = \frac{1}{3} \ln|\ln|x^3|| + c$$

$$\textcircled{23} \int \frac{2x}{(x-1)^2} dx$$

$$u = x-1 \quad \left\{ \begin{array}{l} x = u+1 \\ du = dx \end{array} \right.$$

$$du = dx$$

$$\int \frac{2(u+1)}{u^2} du = \int \frac{2u+2}{u^2} du = \int 2 \cdot \frac{1}{u} + 2u^{-2} du$$

$$= 2 \ln|x-1| - \frac{2}{x-1} + c$$