

$$[5] \quad 3. \int_1^e \frac{\ln(x)}{x} dx$$

$$\left(\begin{array}{l} u = \ln(x) \\ du = \frac{dx}{x} \end{array} \right)$$

$$= \int_{u=0}^1 u \, du$$

$$= \left[\frac{u^2}{2} \right]_0^1 =$$

$$\frac{1}{2} = \frac{1}{2} \quad [\text{no constant of integration}]$$

$$[5] \quad 4. \int_0^{\frac{\pi}{2}} \frac{\cos(x)}{\sin(x)+1} dx$$

$$u = \sin(x)+1$$

$$du = \cos(x) dx$$

$$\int_{u=1}^2 \frac{du}{u} = [\ln u]_1^2 = \ln(2) \quad [\text{no } c]$$

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[5] 1. $\int (x+1)(x^2+2x+3)^{17} dx$

$$= \int \frac{u^{17}}{2} du$$

$$= \frac{u^{18}}{36} + C = \frac{1}{36} (x^2+2x+3)^{18} + C$$

$$\begin{cases} u = x^2 + 2x + 3 \\ du = 2x + 2 dx \end{cases}$$

[5] 2. $\int \sec(x) \tan(x) e^{\sec(x)} dx$

$$= \int e^u du = e^u + C$$

$$= e^{\sec x} + C$$

$$\begin{cases} u = \sec x \\ du = \sec x \tan x \end{cases}$$