# ZATIKAKOAK

$$\left\{ \int u \cdot dv = u \cdot v - \int v\, du. \right.$$

ALPES

350) 12.

a) $\int \underset{P}{x}\, \underset{E}{e^{2x}}\, dx$

$$\left\{ \begin{array}{l} u = x \longrightarrow du = dx \\ dv = e^{2x} dx \rightarrow v = \frac{1}{2}\int 2e^{2x} dx = \frac{1}{2} e^{2x} \end{array} \right.$$

$$I = x \cdot \frac{1}{2} e^{2x} - \int \frac{1}{2} e^{2x} dx = \frac{1}{2} x \cdot e^{2x} - \frac{1}{2}\frac{1}{2}\int 2e^{2x} dx$$

$$= \frac{x \cdot e^{2x}}{2} - \frac{1}{4} e^{2x} + K = \boxed{\frac{e^{2x}}{2}\left(x - \frac{1}{2}\right) + K}$$

b) $\int \underset{P}{x^2}\, \underset{L}{\ln x}\, dx$

$$\left\{ \begin{array}{l} u = \ln x \longrightarrow du = \frac{1}{x} dx \\ dv = x^2 dx \longrightarrow v = \frac{x^3}{3} \end{array} \right.$$

$$I = \ln x \cdot \frac{x^3}{3} - \int \frac{x^3}{3} \cdot \frac{1}{x} dx = \ln x\, \frac{x^3}{3} - \frac{1}{3}\int x^2 dx =$$

$$= \frac{x^3 \cdot \ln x}{3} - \frac{1}{3}\frac{x^3}{3} + K = \boxed{\frac{x^3}{3}\left(\ln x - \frac{1}{3}\right) + K}$$

c) $\int 3x \cdot \cos x\, dx = 3 \underbrace{\int \underset{P}{x} \cdot \underset{S}{\cos x}\, dx}_{I} =$

$$\begin{array}{l} u = x \longrightarrow du = dx \\ dv = \cos x\, dx \longrightarrow v = \sin x \end{array}$$

$$I = x \cdot \sin x - \int \sin x \cdot dx$$

$$= x \cdot \sin x - (-\cos x) + K$$

$$= x \cdot \sin x + \cos x + K.$$

$$\boxed{\int 3x \cdot \cos x\, dx = 3 \cdot (x \sin x + \cos x) + K.}$$

d) $\int \underbrace{\ln(2x-1)}_{L} \underbrace{dx}_{P}$

$$\begin{cases} u=\ln(2x-1) \longrightarrow du = \dfrac{2}{2x-1}dx \\ dv = dx \longrightarrow v = x \end{cases}$$

$$I = \ln(2x-1)\cdot x - \int x \cdot \frac{2}{2x-1}\,dx =$$

$$\begin{array}{r|l} 2x & 2x-1 \\ \hline -2x+1 & 1 \\ 1 & \end{array}$$

$$= \ln(2x-1)\cdot x - \int \left(1 + \frac{1}{2}\frac{2\cdot 1}{2x-1}\right)dx$$

$$= \boxed{x\cdot \ln(2x-1) - x - \frac{\ln|2x-1|}{2} + K}$$

e) $\int \frac{\overset{P}{x}}{\underset{E}{e^x}}\,dx$

$$\begin{cases} u = x \longrightarrow du = dx \\ dv = \underbrace{\frac{1}{e^x}}_{e^{-x}}dx \longrightarrow v = \frac{1}{(-1)}\int -1\cdot e^{-x}dx = \frac{e^{-x}}{-1} = -e^{-x} \end{cases}$$

$$I = x\cdot(-e^{-x}) - \int(-e^{-x})\,dx = -xe^{-x} + \frac{1}{(-1)}\int(-1)e^{-x}dx =$$

$$= -xe^{-x} - e^{-x} + k. = \boxed{e^{-x}(-x-1)+k}$$

f) $\int \underset{A}{\arccos x}\,dx$

$$\begin{cases} u = \arccos x \rightarrow du = \dfrac{-1}{\sqrt{1-x^2}}dx \\ dv = dx \longrightarrow v = x \end{cases}$$

ordezkapen

$$I = \arccos x \cdot x - \int x \cdot \frac{-1}{\sqrt{1-x^2}}\,dx = \arccos x \cdot x + \underbrace{\int \frac{x}{\sqrt{1-x^2}}dx}_{I_2}$$

Baita ordezkapena: $\boxed{1-x^2=t^2}$ aldatzen

$$I_2 = \int \frac{x}{\sqrt{1-x^2}}dx = \int \frac{1}{\sqrt{t}}\cdot\frac{dt}{(-2)} = \int \frac{t^{-1/2}}{-2} =$$

ordezkapen $t = 1-x^2 \quad dt = -2x\,dx \longrightarrow \frac{dt}{-2} = x\,dx$

$$I_2 = -1/2 \cdot \frac{t^{-1/2+1}}{-1/2+1} = -\frac{2}{2}\sqrt{t} = -\sqrt{t} = -\sqrt{1-x^2}$$

$$I = \arccos x \cdot x + (-\sqrt{1-x^2}) + k = \boxed{x\cdot \arccos x - \sqrt{1-x^2} + k}$$