Degisken Donusturme

u=f(x) $\frac{du}{dx} = f'(x)$

du=f '(x) dx

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u=sin x ==> du=cos x dx
u= x^2 ==> du= 2x dx
u= x^n ==> du= nx^{n-1} dx

u= tan x ==> du= $\frac{1}{\cos^2 x} dx$

u= arc tan x ==> du= $\frac{1}{1+x^2} dx$

u= Ln x ==> du= $\frac{1}{x} dx$

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81) $\int \sin x \cos x \, dx = ?$

u=sinx ==>du=cos x dx

$$\int \sin x \cos x \, dx = \int u \, du = \frac{u^2}{2} = \frac{\sin^2 x}{2}$$

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83) $\int \sin^5 x \cos x \, dx = ?$

u=sinx ==>du=cos x dx

$$\int \sin^5 x \cos x \, dx = \int u^5 \, du = \frac{u^6}{6} = \frac{\sin^6 x}{6}$$

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85) $\int \tan x \frac{1}{\cos^2 x} dx = ?$

u=tan x, $du = \frac{1}{\cos^2 x} dx$

$$\int \tan x \frac{1}{\cos^2 x} dx = \int u \, du = \frac{u^2}{2} = \frac{\tan^2 x}{2}$$

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87) $\int \frac{\cos x}{\sin x} dx = ?$

u=sin x =>du=cos x dx

$$\int \frac{\cos x}{\sin x} dx = \int \frac{du}{u} = \mathrm{Ln}(u) = \mathrm{Ln}(\sin x)$$

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89) $\int \frac{2x}{x^2+10} dx = ?$

u=x^2, du=2x dx

$$\int \frac{2x}{x^2+10} dx = \int \frac{du}{u} = \mathrm{Ln}(u) = \mathrm{Ln}(x^2+10)$$

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91) $\int 2x \sin x^2 \, dx = ?$

u=x^2, du=2x dx

$$\int 2x \sin x^2 \, dx = \int \sin u \, du = -\cos u = -\cos x^2$$

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93) $\int 2x \sin x^2 \, dx = ?$

u=x^2, du=2x dx

$$\int 2x \sin x^2 \, dx = \int \sin u \, du = -\cos u = -\cos x^2$$

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95) $\int e^{x^2} 2x \, dx = ?$

u=x^2, du=2x dx

$$\int e^{x^2} 2x \, dx = \int e^u du = e^u = e^{x^2}$$

Degisken donusumu sonucu elde edilen integralde ilk degisken kalmamalidir.

101) $\int 2x^2 \sin x^2 \, dx = ?$

u=x^2, du=2x dx

$$\int 2x^2 \sin x^2 \, dx = \int x \sin u \, du$$

HATA HATA HATA

elde edilen yeni integralde hem yeni degisken u, hem de eski degisken x var. Bu yanlis bir donusumdur. Bu intgegral u=x^2 donusumu ile cozulemez. Baska bir donusum veya baska bir metod uygulamak lazim.

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103) $\int e^{x^2} dx = ?$

u=x^2, du=2x dx , dx= $\frac{du}{2x}$

$$\int e^{x^2} dx = \int e^u \frac{du}{2x}$$

HATA else edilen yeni integralde hem yeni degisken u, hem de eskidegisken x var.

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