03.01

Integrazione per parti: ex. 526/531 pag. 123 ex. 312/314 pag. 112
Integrazione per sostituzione: ex. 484/509 pag. 123
Integrali composti: ex.488 pag. 122 ex. 505/518/538 pag. 123/124

[P. 112 ES. 312]

$f(x) = x \quad g'(x) = e^{1-2x}$

312 $\int xe^{1-2x}\,dx$ $\left[-\frac{1}{4}(2x+1)e^{1-2x}+c\right]$

INTEGRAZIONE PER PARTI → $\left[\int f(x)g'(x)dx = f(x)g(x) - \int f'(x)g(x)dx + c\right]$

$= \int f(x)\cdot g'(x) = \int x \cdot e^{1-2x}$

$g(x) = \int e^{1-2x}\,dx$ $\quad t = 1-2x \rightarrow \frac{t-1}{2} = \frac{-2x}{2}$

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

$= -\frac{1}{2}\int e^t\,dt \quad [dx = \frac{1}{2}]$

$= e^t + C = e^{1-2x} + C \rightarrow g$

312 $\int xe^{1-2x}\,dx$ $\left[-\frac{1}{4}(2x+1)e^{1-2x}+c\right]$

$f \quad g'$

→ $\left[\int f(x)g'(x)dx = f(x)g(x) - \int f'(x)g(x)dx + c\right]$

$f(x) = x$

$f'(x) = 1$

$\int xe^{1-2x}\,dx = -\frac{x}{2}e^{1-2x} - \int -\frac{1}{2}e^{1-2x}$

$f \quad g$

P. 112 ES. 314

$f = x \quad g' = e^{4x}$

$f' = 1$

314 $\int x e^{4x}\,dx$ $\quad \left[e^{4x}\left(\frac{x}{4}-\frac{1}{16}\right)+c\right]$

INTEGRAZIONE PER PARTI $\rightarrow$ $\left[\int f(x)g'(x)dx = f(x)g(x) - \int f'(x)g(x)dx + c\right]$

$\int x e^{4x}\,dx = x \cdot \int e^{4x}\,dx - \dots$

$g(x) = \int e^{4x}\,dx \qquad 4x = t \qquad dx = \frac{1}{4}dt$

$= \frac{1}{4}\int e^t\,dt = \frac{1}{4}e^{4x} + c$

$\left[\int f(x)g'(x)dx = f(x)g(x) - \int f'(x)g(x)dx + c\right]$

$= x\,\frac{1}{4}e^{4x} - \int \frac{1}{4}e^{4x}\,dx$

$= x\,\frac{1}{4}e^{4x} - \frac{1}{16}e^{4x} + c = \left(\frac{x}{4}-\frac{1}{16}\right)e^{4x} + c$

P. 122 ES. 484

$\int (1+x)^{1/3} = \frac{4}{3}(1+x)^{4/3}$

484 $\int x\sqrt[3]{1+x}\,dx$ $\quad \left[\frac{3}{28}(4x-3)\sqrt[3]{(x+1)^4}+c\right]$

$\frac{4}{3}\left(\frac{1}{2}\right)^2\sqrt[3]{(1+x)^4}$

$\frac{2}{3}\sqrt[3]{(1+x)^4}$

$1+x = A$

$x = A-1$

$dx = 1$

$= \int A-1\sqrt[3]{A}\,dA$

INTEGR. PER PARTI ....

05/01

P. 122 es. 488

488 $\int \frac{x}{4x^2+1}\,dx$ $\left[\frac{1}{8}\ln(4x^2+1)+c\right]$

$t = 4x^2+1 \rightarrow t-1 = 4x^2$

$dt = 4 \cdot 2x^{2-1} \cdot 0$

$\frac{t-1}{4} = x$

$\frac{t}{4} - \frac{1}{4} = x$

$\frac{1}{4} = dx$

$dx = \frac{1}{8} \Leftarrow \frac{dt}{8} = \frac{8x}{8}$

$\int \frac{x}{(4x^2+1)}\,dx \rightarrow = \left[\frac{1}{8}\right]\int \frac{1}{t}\,dt = \frac{1}{8}\ln(t)$

$= \frac{1}{8}\ln(4x^2+1) + c$

es. 505 P. 123

505 $\int \frac{t}{\sqrt{t^2+4}}\,dt$ $\left[\sqrt{t^2+4}+c\right]$

$t^2+4 = s$

$t = \frac{1}{2}$ $\quad \frac{2t\,dt}{2t} = \frac{ds}{2t}$

$\int \frac{t}{\sqrt{t^2+4}}\,dt = \frac{1}{2}\int \frac{1}{\sqrt{s}}\,ds$

$= \frac{1}{2}\int s^{-1/2}\,ds = \frac{1}{2}\,\frac{s^{1/2}}{1/2} = \frac{1}{2}\cdot 2 s^{1/2}$

$= \left[\sqrt{t^2+4}+c\right]$

Es. 508 p. 123

509 $\int x(x+3)^{10}dx$ $\left[\frac{1}{12}(x+3)^{12}-\frac{3}{11}(x+3)^{11}+c\right]$

Es. 518 p. 123

518 $\int e^{\sin t}\cos t\,dt$ $[e^{\sin t}+c]$

Es. 526 p. 123

526 $\int xe^{3x}\,dx$ $\left[\frac{1}{9}(3x-1)e^{3x}+c\right]$