

Risolvi i seguenti integrali tutti “riconducibili a schemi di integrazione”

$$\begin{array}{llll}
 \text{a)} \int \sqrt{2x+5} \, dx & \text{b)} \int \frac{x}{\sqrt{(x^2+5)^3}} \, dx & \text{c)} \int x^3 (8+x^4)^{-\frac{5}{3}} \, dx & \text{d)} \int \frac{3e^x}{1+e^{2x}} \, dx \\
 \text{e)} \int \frac{1}{x\sqrt{1-\log^2 x}} \, dx & \text{f)} \int \frac{1}{x(\log x)^{2/3}} \, dx & \text{g)} \int xe^{x^2} \, dx & \text{h)} \int \tan x \, dx \\
 \text{i)} \int \frac{1}{\sin 2x} \, dx & \text{j)} \int 7x \cos(3x^2-5) \, dx & \text{k)} \int \cos x \sqrt{\sin x} \, dx & \text{l)} \int \frac{x}{\cos^2(3x^2+5)} \, dx
 \end{array}$$

Soluzioni

$$\begin{array}{l}
 \text{(a)} \int \sqrt{2x+5} \, dx = \frac{1}{2} \int 2(2x+5)^{1/2} \, dx = \frac{1}{2} \frac{(2x+5)^{3/2}}{3/2} + c = \frac{1}{3} \sqrt{(2x+5)^3} + c \\
 \text{(b)} \int \frac{x}{\sqrt{(x^2+5)^3}} \, dx = \frac{1}{2} \int 2x \cdot (x^2+5)^{-3/2} \, dx = \frac{1}{2} \frac{(x^2+5)^{-1/2}}{-1/2} + c = -\frac{1}{\sqrt{x^2+5}} + c \\
 \text{(c)} \int x^3 (8+x^4)^{-\frac{5}{3}} \, dx = \frac{1}{4} \int 4x^3 (8+x^4)^{-\frac{5}{3}} \, dx = \frac{1}{4} \frac{(8+x^4)^{-\frac{2}{3}}}{-\frac{2}{3}} + c = -\frac{3}{8} \frac{1}{\sqrt[3]{(8+x^4)^2}} + c \\
 \text{(d)} \int \frac{3e^x}{1+e^{2x}} \, dx = 3 \int \frac{e^x}{1+(e^x)^2} \, dx = 3 \arctan(e^x) + c \\
 \text{(e)} \int \frac{1}{x\sqrt{1-\log^2 x}} \, dx = \int \frac{1/x}{\sqrt{1-(\log x)^2}} \, dx = \arcsin(\log x) + c \\
 \text{(f)} \int \frac{1}{x(\log x)^{2/3}} \, dx = \int \frac{1}{x} (\log x)^{-2/3} \, dx = \frac{(\log x)^{1/3}}{1/3} + c = 3\sqrt[3]{\log x} + c \\
 \text{(g)} \int xe^{x^2} \, dx = \frac{1}{2} \int 2xe^{x^2} \, dx = \frac{1}{2} e^{x^2} + c \\
 \text{(h)} \int \tan x \, dx = \int \frac{\sin x}{\cos x} \, dx = -\int \frac{-\sin x}{\cos x} \, dx = -\log |\cos x| + c \\
 \text{(i)} \int \frac{1}{\sin 2x} \, dx = \int \frac{1}{2 \sin x \cos x} \, dx = \frac{1}{2} \int \frac{\cos x}{\sin x \cos^2 x} \, dx = \frac{1}{2} \int \frac{1}{\cos^2 x} \frac{1}{\tan x} \, dx = \frac{1}{2} \log |\tan x| + c \\
 \text{(j)} \int 7x \cos(3x^2-5) \, dx = \frac{7}{6} \int 6x \cos(3x^2-5) \, dx = \frac{7}{6} \sin(3x^2-5) + c \\
 \text{(k)} \int \cos x \sqrt{\sin x} \, dx = \int \cos x (\sin x)^{1/2} \, dx = \frac{2}{3} (\sin x)^{3/2} + c = \frac{2}{3} \sqrt{\sin^3 x} + c
 \end{array}$$