Studio integrali

giovedì 9 giugno 2022 17:21

1) Scrivere primitive di $x^2 + \frac{1}{x} - \sin x$

$$\int x^2 + \frac{1}{x} - \sin x = \frac{x^3}{3} + \ln x + \cos x + c$$

2) $$\int_1^2 \left(\frac{1}{x} + 2x\right) = [\ln x + x^2]_1^2 = (\ln 2 + 4) - 1 = \ln 2 + 3$$

3) $$\int_{\frac{\pi}{2}}^{\pi} x * \sin x$$

$x \to 1$

$\sin x \to -\cos x$

$-x \cos x + \int \cos x$

$$[-x \cos x + \sin x]_{\frac{\pi}{2}}^{\pi} = (-\pi \cos \pi + \sin \pi) - \left(-x \cos \frac{\pi}{2} + \sin \frac{\pi}{2}\right)$$

$\cos \pi = -1$

$\sin \pi = 0$

$\cos \frac{\pi}{2} = 0$

$\sin \frac{\pi}{2} = 1$

4) $$\int_1^2 \left(\frac{1}{x} + 2x\right) = [\log x + x^2]_1^2$$

$\log 2 + 4 - 1 = \log 2 - 3$

5) $$\int_0^2 \frac{x}{x^2 + 1}$$

$$\frac{1}{2} \int \frac{2x}{x^2 + 1} = \left[\frac{\ln(x^2 + 1)}{2}\right]_0^2$$

$$= \frac{\ln(5)}{2}$$

6) $$\int_0^1 x e^x$$

$x \to 1$

$e^x \to e^x$

$x e^x - e^x$

$[e^x (x - 1)]_0^1$

$= 1$