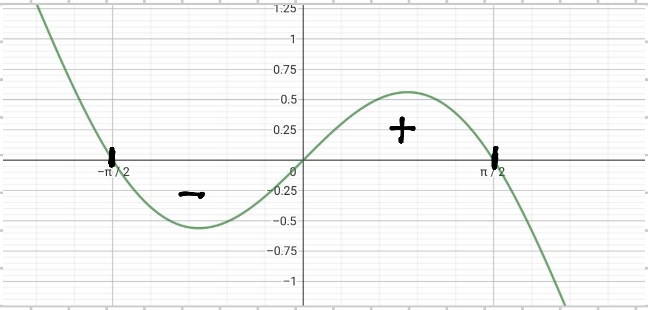
82 $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} x\cos x\, dx$ [0]

$f(x) = x\cos x$ è dispari $\quad f(-x) = -x\cdot\cos(-x) = -x\cos x = -f(x)$



L'integrale di una funzione dispari su un intervallo simmetrico rispetto a 0 è 0

Calcolo comunque le primitive di $x\cos x$

$$\int x\cos x\, dx = \int x\cdot(\sin x)'\, dx = x\sin x - \int \sin x\, dx =$$

$$= x\sin x + \cos x + c$$

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

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

528 $\int \frac{x^2+8x+18}{x^2+6x+9}\,dx = \left[x+\ln(x+3)^2-\frac{3}{x+3}+c\right]$

$$=\int\left[\frac{x^2+6x+9}{x^2+6x+9}+\frac{2x+9}{x^2+6x+9}\right]dx =$$

$$=\int dx+\int\frac{2x+9}{x^2+6x+9}\,dx = x+\int\frac{2x+6}{x^2+6x+9}\,dx+\int\frac{3}{x^2+6x+9}\,dx =$$

$$= x+\ln|x^2+6x+9|+\int\frac{3}{(x+3)^2}\,dx =$$

$$= x+\ln(x+3)^2+\int\frac{3}{t^2}\,dt = x+\ln(x+3)^2+3\int t^{-2}\,dt =$$

$$t = x+3 \qquad x = t-3 \qquad \frac{dx}{dt} = 1 \Rightarrow dx = dt$$

$$= x+\ln(x+3)^2-3t^{-1}+c = \boxed{x+\ln(x+3)^2-\frac{3}{x+3}+c}$$