Questao 2

quinta-feira, 13 de maio de 2021 13:20

$x = \frac{\pi}{2}$

a) $u = \cos x \qquad -du = +\operatorname{sen} x\, dx \; (-1)$

$\int \operatorname{sen} x \cos x\, dx = \int \cos x \cdot \operatorname{sen} x\, dx = -\int u \cdot du$

$\boxed{-\frac{u^2}{2} + c} \to \boxed{-\frac{\cos^2 x}{2} + c}$

b) $\int \operatorname{sen} x \cdot \cos x\, dx = \int u\, du = \frac{u^2}{2} + c = \boxed{\frac{\operatorname{sen}^2 x}{2} + c}$

$u = \operatorname{sen} x \to du = \cos x\, dx$

c) $\int \operatorname{sen} x \cos x\, dx = \int \frac{1}{2} \cdot \operatorname{sen}(2x)\, dx = \frac{1}{2} \int \operatorname{sen} 2x\, dx$

$\boxed{u = 2x \to du = 2dx \quad \frac{du}{2} = dx}$

$\frac{1}{2} \int \operatorname{sen}(u) \cdot \frac{1}{2}\, du = \frac{1}{2} \cdot \frac{1}{2} \int \operatorname{sen} u\, du = \frac{1}{4}(-\cos(u)) = \boxed{-\frac{\cos(2x)}{4} + c}$

d) $\int \operatorname{sen} x \cos x\, dx$

$u = \operatorname{sen} x \rightsquigarrow du = \cos x\, dx$

$dv = \cos x\, dx \rightsquigarrow v = \operatorname{sen} x$

$\int \operatorname{sen} x \cos x\, dx = \operatorname{sen} x \cdot \operatorname{sen} x - \int \operatorname{sen} x \cdot \cos x\, dx$

$2 \int \operatorname{sen} x \cos x\, dx = \operatorname{sen}^2 x$

$\int \operatorname{sen} x \cos x\, dx = \frac{\operatorname{sen}^2 x}{2} + c$

e) Apesar de os resultados terem uma grafia diferente, todos são equivalentes quando submetemos à um intervalo definido:

Ex:

Para $\boxed{\int_0^{\frac{\pi}{2}}}$

a) $0 - \left(-\frac{1}{2}\right) = \frac{1}{2} \qquad \boxed{-\frac{\cos^2 x}{2} + c}$

b) $\frac{1}{2} - 0 = \frac{1}{2} \qquad \boxed{\frac{\operatorname{sen}^2 x}{2} + c}$

$\boxed{\frac{\ }{2}}$ $\boxed{\frac{\sin^2 x}{2}+c}$

c) $\frac{1}{4} - \left(-\frac{1}{4}\right) = \frac{1}{4} + \frac{1}{4} = \frac{2}{4} = \boxed{\frac{1}{2}}$ $\boxed{\frac{-\cos 2x}{4}+C}$

d) $\frac{1}{2} - 0 = \boxed{\frac{1}{2}}$ $\boxed{\frac{\sin^2 x}{2}+c}$