Produktintegration zweier trigonometrischer Funktionen

Bestimmen Sie $\int_0^{\frac{1}{2}\pi} \sin(x)\cdot \cos(x)\, dx$

u(x)= sin(x) u‘$(x) = \cos(x)$

v (x)= sin(x) v‘(x) = cos (x)

Zur Erinnerung $\int u' \cdot v = [u \cdot v]$ - $\int u \cdot v'$ Wir addieren

$\int_0^{\frac{1}{2}\pi} \sin(x)\cdot \cos(x)\, dx = [\sin(x)\cdot \sin(x)]_0^{\frac{1}{2}\pi} - \int_0^{\frac{1}{2}\pi} \sin(x)\cdot \cos(x)\, dx \mid + \int_0^{\frac{1}{2}\pi} \sin(x)\cdot \cos(x)\, dx$

$2\int_0^{\frac{1}{2}\pi} \sin(x)\cdot \cos(x)\, dx = [\sin(x)\cdot \sin(x)]_0^{\frac{1}{2}\pi}$

$2\int_0^{\frac{1}{2}\pi} \sin(x)\cdot \cos(x)\, dx = [\sin(\frac{1}{2}\pi)\cdot \sin(\frac{1}{2}\pi)]_0^{\frac{1}{2}\pi} = [\sin(\frac{1}{2}\pi)\cdot \sin(\frac{1}{2}\pi) - \sin(0)\cdot \sin(0)]$

$2\int_0^{\frac{1}{2}\pi} \sin(x)\cdot \cos(x)\, dx = [\sin(\frac{1}{2}\pi)\cdot \sin(\frac{1}{2}\pi)]_0^{\frac{1}{2}\pi} = 1\cdot 1 - 0\cdot 0 \mid :2$

$\int_0^{\frac{1}{2}\pi} \sin(x)\cdot \cos(x)\, dx = [\sin(\frac{1}{2}\pi)\cdot \sin(\frac{1}{2}\pi)]_0^{\frac{1}{2}\pi} = 1 : 2$

$= \frac{1}{2}$

Bestimmen Sie $\int_0^{\frac{1}{2}\pi} \sin(x)\cdot \cos(x)\, dx$

Nun aber mit folgender Einteilung:

u(x)= -cos(x) u‘$(x) = \sin(x)$

v (x)= cos(x) v‘(x) = -sin (x)

Zur Erinnerung $\int u' \cdot v = [u \cdot v]$ - $\int u \cdot v'$

$\int_0^{\frac{1}{2}\pi} \sin(x)\cdot \cos(x)\, dx = [-\cos(x) * \cos(x)] - \int_0^{\frac{1}{2}\pi} -\cos(x)\cdot(-\sin(x)\, dx)$

$\int_0^{\frac{1}{2}\pi} \sin(x)\cdot \cos(x)\, dx = [-(\cos(x))^2] - \int_0^{\frac{1}{2}\pi} \cos(x)\cdot \sin(x)\, dx \mid + \int_0^{\frac{1}{2}\pi} \cos(x)\cdot \sin(x)\, dx$

$2\cdot \int_0^{\frac{1}{2}\pi} \sin(x)\cdot \cos(x)\, dx = [-(\cos(x))^2]$

$2\cdot \int_0^{\frac{1}{2}\pi} \sin(x)\cdot \cos(x)\, dx = -(\cos(\frac{1}{2}\pi))^2 - (-\cos(0))^2$

$2\cdot \int_0^{\frac{1}{2}\pi} \sin(x)\cdot \cos(x)\, dx = -(0)^2 + 1^2$

$2\cdot \int_0^{\frac{1}{2}\pi} \sin(x)\cdot \cos(x)\, dx = 1 \mid :2$

$\int_0^{\frac{1}{2}\pi} \sin(x)\cdot \cos(x)\, dx = \frac{1}{2}$