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Find the Integrals

1) $\int \sin 7x \cos 2x \, dx$

Solutions

$= \int \frac{\sin(7x)\cos(2x)}{2} \, dx$

$= 1/2 \cdot \int \sin(7x+2x) + \sin(7x-2x) \, dx$

$= 1/2 \left(\int \sin(7x+2x) \, dx + \int \sin(7x-2x) \, dx \right)$

$\int \sin(7x+2x) \, dx = -1/9 \cos(9x)$

$\int \sin(7x+2x) \, dx$

Apply U-Substitution $u = 7x+2$

$= \int \sin(u) \, 1/9 \, du$

$= 1/9 (-\cos(u))$

$= 1/9 (-\cos(7x+2x))$

Simplify $1/9 (-\cos(7x+2x)) = -\frac{1}{9}\cos(9x)$

$1/9 (-\cos(7x+2x))$

$= -1/9 \cos(7x+2x)$

$= \frac{-1 \cdot \cos(7x+2x)}{9}$

$1 \cdot \cos(7x+2x)$

$= 1 \cdot \cos(9x) = \cos(9x)$

$= -\frac{\cos(9x)}{9} = \frac{-1}{9}\cos(9x)$

$= -1/9 \cos(9x)$

$\int \sin(7x-2x)\,dx = -\frac{1}{5}\cos(5x)$

$\int \sin(7x-2x)\,dx$

Apply u-Substitution: $u = 7x-2x$

$= \int \sin(u)\frac{1}{5}\,dx$

$= \frac{1}{5}\int \sin(u)\,du$

$= \frac{1}{5}(-\cos(7x-2x))$

$= -\frac{1}{5}\cos(7x-2x)$

$= -\frac{1+\cos(7x-2x)}{5}$

$1+\cos(7x-2x)$

$= 1+\cos(5x)$

$= \cos(5x)$

$= \cos(5x)$

$= -\frac{\cos(5x)}{5}$

$= -\frac{1}{5}\cos(5x)$

$= -\frac{1}{5}\cos(5x)$

$= \frac{1}{2}\left(-\frac{1}{9}\cos(9x) - \frac{1}{5}\cos(5x)\right)$

$= \frac{1}{2}\left(-\frac{1}{9}\cos(9x) - \frac{1}{5}\cos(5x)\right) + X$

2) $\int \cos x \, dx$

Solution

The function has no undefined points nor domain constraints. Therefore the domain is $-\infty < x < \infty$

$y = \cos(3 \cdot 0)\cos(0)\,d0; \quad x = 0$

$\cos(3 \cdot 0)\cos(0)\,d0$

$\cos(3 \cdot 0)\cos(0)\,d0$

$= \cos(0)\cos(0)\,d0$

$= \cos^{1+1}(0)\,d0$

$= \cos^2(0)\,d0$

$= \cos^2(0)\,d0$

$= 1^2\,d0$

$= d0$

3) $\int \cos x / \sin^2 x \, dx$

Solutions

$\int \cos\left(\frac{x}{\sin(2x)}\right) dx = \int \cos\left(x \cos(2x)\right) dx$

$\int \cos\left(\frac{x}{\sin(2x)}\right) dx$

$\frac{x}{\sin(2x)}$

$= \int \cos(2x)\,dx$

$= \int \cos(x \cos(2x))\,dx$