Resolución De Simulacro

$$\int \tan^{-1}(x^2)\, x\, dx = \frac{1}{2}\int \tan^{-1}(u)\, du =$$

$u = x^2$

$\frac{du}{2} = x\,dx$

$uv - \int v\,du$

$$= \frac{1}{2}\left\{ \tan^{-1}(u)\, u - \underbrace{\int u \frac{1}{u^2+1}} \right\}$$

$\upsilon = \tan^{-1}(u)$ $\quad dv = du$

$d\upsilon = \frac{1}{u^2+1}\,du$ $\quad v = u$

$$= \int \frac{u}{u^2+1}\,du = \frac{1}{2}\int \frac{1}{\varepsilon}\,d\varepsilon$$

$\varepsilon = u^2+1$

$d\varepsilon = 2u\,du$

$\frac{d\varepsilon}{2} = u\,du$

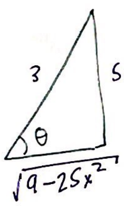
$$= \boxed{\frac{1}{2}\ln|\varepsilon|}$$

$$= \frac{1}{2}\left\{ \tan^{-1}(u)\, u - \frac{1}{2}\ln|u^2+1| \right\}$$

$$= \frac{1}{2}\tan^{-1}(x^2)\cdot x^2 - \frac{1}{4}\ln|x^4+1| + C \quad \square$$

$$\int \frac{x^2}{\sqrt{9-25x^2}}\,dx = \int \frac{\left[\frac{9\sin^2\theta}{25}\right]}{\left[\frac{3\cos\theta}{1}\right]}\cdot \frac{3}{5}\cos\theta = \int \frac{9\sin^2\theta}{\cancel{3}\cdot 25\,\cancel{\cos\theta}}\cdot\frac{\cancel{3}\,\cancel{\cos\theta}}{5}\,d\theta =$$

$$= \int \frac{9}{125}\sin^2\theta\, d\theta = \frac{9}{125}\int\left(\frac{1}{2} - \frac{\cos(2\theta)}{2}\right)d\theta$$



$c^2 = a^2 + b^2$

$0 = -c^2 + a^2 + b^2$

$-1(-b^2) = (-c^2 + a^2)$

$b^2 = c^2 - a^2$

$c^2 - a^2 = b^2$

$$= \frac{9}{125}\left[\frac{\theta}{2} - \frac{1}{2}\int \cos(2\theta)\,d\theta\right]$$

S $\frac{O}{H}$ C $\frac{A}{H}$ T $\frac{O}{A}$

$\sin\theta = \frac{5x}{3}$

$\left(\frac{3\sin\theta}{5}\right)^2 = (x)^2 \longrightarrow$

dx

$$\boxed{\frac{3}{5}\cos\theta\, d\theta = dx}$$

$$= \frac{9}{125}\left[\frac{\theta}{2} - \frac{1}{2}\,\frac{\sin(2\theta)}{2}\right]$$

$\cos\theta = \frac{\sqrt{9-25x^2}}{3}$

$$\boxed{3\cos\theta = \sqrt{9-25x^2}}$$

$\sqrt{9-25x^2}$

$$\boxed{\frac{9}{25}\sin^2\theta = x^2}$$

x^2

$$= \frac{9}{125}\cdot\frac{\theta}{2} - \frac{9}{125}\cdot\frac{1}{2}\cdot\frac{1}{2}\sin(2\theta)$$

$$= \frac{9}{125\cdot 2}\theta - \frac{9}{125\cdot 4}\sin(2\theta) + C$$

$$= \frac{9}{125\cdot 2}\sin^{-1}\left(\frac{5x}{3}\right) - \frac{9}{125\cdot 4}\,2\sin\theta\cos\theta + C$$

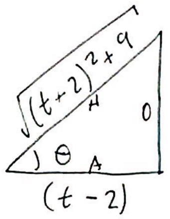
$$= \frac{9}{125\cdot 2}\sin^{-1}\left(\frac{5x}{3}\right) - \frac{9}{125\cdot 2}\cdot\left(\frac{5x}{3}\right)\left(\frac{\sqrt{9-25x^2}}{3}\right) + C$$

③

$$\int \frac{1}{\sqrt{(t-2)^2+9}}\,dt = \int \frac{-3\csc^2\theta\,d\theta}{3\csc\theta} = -\int \frac{\csc\theta\cdot\csc\theta}{\cancel{\csc\theta}}\,d\theta = -\int \csc\theta\,d\theta = +\ln|\csc\theta+\cot\theta| + C$$

$$= \ln\left|\frac{\sqrt{(t-2)^2+9}}{3} + \frac{t-2}{3}\right| + C$$

□



$S\frac{O}{H}\;C\frac{A}{H}\;T\frac{O}{A}$

$\csc\theta$ $\frac{H}{O}$ $\sec\theta$ $\frac{H}{A}$

$$\boxed{3\csc\theta = \sqrt{(t-2)^2+9}}$$

$$\csc\theta = \frac{\sqrt{(t-2)^2+9}}{3}$$

$\cot\theta = \left(\frac{t-2}{3}\right)$

$\cot\theta = \frac{t}{3} - \frac{2}{3}$

$-\csc^2\theta = \frac{1}{3} - 0\,dt$

$-\csc^2\theta = \frac{1}{3}dt$

$\boxed{-3\csc^2\theta\,d\theta = dt}$

④

$$\int \frac{xe^x}{(x+1)^2}\,dx$$

$f'g + fg'$

LIPET
log
Inverse trig
Powers
expon
trigg

$u = xe^x$ $\quad dv = \frac{1}{(x+1)^2}dx$

$du = e^x + xe^x\,dx$ $\quad v = -\frac{1}{(x+1)}$

$\frac{1}{(x+2)^2}$ $\int \underbrace{(x+2)^{-2}}\,dx$

$u = x+1$

$du = dx$

$= \int u^{-2}\,du$

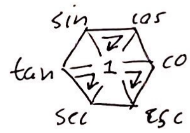
$= \frac{u^{-1}}{-1} = -\frac{1}{(x+1)}$

$$= -\frac{xe^x\cdot 1}{(x+1)} - \underbrace{\int -\frac{1}{(x+1)}\,e^x + xe^x\,dx}$$

$$\int -\frac{e^x\cancel{(x+1)}}{\cancel{(x+1)}}\,dx$$

$$= -\frac{xe^x}{x+1} - \left\{-\left[e^x\right]\right\} + C$$

$$= -\frac{xe^x}{x+1} + e^x + C \quad □$$



$\sin^2\theta + \cos^2\theta = 1$

$\tan^2\theta + 1^2 = \sec^2\theta$

$1 + \cot^2\theta = \csc^2\theta$

$\sin = \frac{1}{\csc}$

$\tan = \frac{\sin}{\cos}$

$\cos\tan = \sin$

$\cos\frac{\sin}{\cancel{\cos}} = \sin$

$$\int \ln\left(\frac{1}{\ln\left(\frac{1}{\ln\left(\frac{1}{\ln\left(\frac{1}{\ln x}\right)}\right)}\right)}\right)\,dx$$

(6)

$$y = m(x - x_1) + y_1 \qquad y = f(a) + f'(a)(x_1 - x_1)$$

$$y = f'(a)(x - a) + f(a)$$

$$f(x) = \int_{\sin(x)}^{2e^x - 2} \sqrt{t^2 + 2t + 4}\, dt \quad \text{en } x = 0$$

$$f(x) = \left((2e^x - 2)^2 + 2(2e^x - 2) + 4\right)^{1/2} - \left(\sin^2(x) + 2\sin x + 4\right)^{1/2}$$

$$\cancel{f'(x) = \frac{1}{2}\left((2e^x - 2)^2 + 4e^x\right)^{-1/2} \cdot \left[2(2e^x - 2) + 4e^x\right] \cdot (2e^x) -}$$

$$\int_a^{x^2} \underbrace{\alpha^4 - \alpha^2 + 16 \, dx}_{} = (x^8 - x^4 + 16) \cdot (8x^7 - 4x^3)$$

$$\int_{x^2}^{a} \text{algo} = - \int_{a}^{x^2} \text{algo}$$