Mate

Ipp (integración por partes)

$$\int u\,dv = uv - \int v\,du$$

Inversa
Logaritmica
Algebraicas
Trigonometrica
Exponencial

← Para decidir cual debería ser la U

$\int x^2 Sen(3x)dx$

Tabulación

	U	dV
+	x^2	$Sen(3x)$
−	$2x$	$-\frac{1}{3}Cos(3x)$
+	2	$-\frac{1}{9}Sen(3x)$
−	0	$\frac{1}{27}Cos(3x)$
+		

$-\frac{x^2}{3}Cos(3x) + \frac{2x}{9}Sen(3x) + \frac{2}{27}Cos(3x)$

$\int e^{2x} Cos(3x)dx \to \frac{1}{2}e^{2x}Cos(3x) - \int -\frac{3}{2}e^{2x}Sen(3x)dx$

$\to \frac{1}{2}e^{2x}Cos(3x) + \frac{3}{2}\int e^{2x}Sen(3x)dx$

Tabulación

U	dV
$Cos(3x)$	e^{2x}
~~$2x$~~ $-3Sen(3x)$	~~$2xe^{2x}$~~ $\frac{1}{2}e^{2x}$
$Cos(3x)$	

$u = Sen(3x)$ $\quad dv = e^{2x}dx$
$du = 3Cos(3x)$ $\quad V = \frac{1}{2}e^{2x}$

$\to \frac{1}{2}e^{2x}Cos(3x)$

$\frac{13}{4}\int e^{2x}Cos(3x)dx = \frac{1}{2}e^{2x}Cos(3x) + \frac{3}{4}Sen(3x)e^{2x}$

$\int e^{2x}Cos(3x)dx = \frac{2}{13}e^{2x}Cos(3x) + \frac{3}{13}e^{2x}Sen(3x)$

$\int arcSen(x)dx$

$u = arcsen(x)$ $\quad dv = dx$
$du = \frac{1}{\sqrt{1-x^2}}\frac{dx}{dx}$ $\quad V = x$

$= x\,arcsen(x) - \int \frac{x}{\sqrt{1-x^2}}dx \to \int (1-x^2)^{-1/2}x\,dx$

cambio de variable

~~$= x\,arcsen(x) + ...$~~

$u = 1 - x^2$
$du = -2x\,dx$

~~$\int u^{-1/2}\,du/2$~~

$\boxed{= x\,arcsen + (1-x^2)^{1/2} + c}$

$-\frac{1}{2}\int u^{-1/2}du = -u^{1/2}$

Escaneado con CamScanner

a) $\int x^2 e^{-2x} dx$ b) $\int x^2 \cos(2x) dx$ c) $\int x^4 \ln(3x) dx$

a) $\int x^2 e^{-2x} dx$

Tabulación

	u	dv
+	x^2	e^{-2x}
−	$2x$	$-1/2 e^{-2x}$
+	2	$1/4 e^{-2x}$
−	0	$-1/8 e^{-2x}$

$$\boxed{-\frac{x^2}{2}e^{-2x} - \frac{x}{2}e^{-2x} + \frac{1}{4}e^{-2x} + C}$$

b) $\int x^2 \cos(2x) dx$

Tabulación

	u	dV
+	x^2	$\cos(2x)$
−	$2x$	$-2\operatorname{Sen}(2x)$
+	2	$\cancel{\cos}\ -\cos(2x)$
−	0	$2\operatorname{Sen}(2x)$

$$\boxed{= 2x^2 \operatorname{Sen}(2x) + 2x^2 \operatorname{Sen}(2x) - 2x\cos(2x) - 4\operatorname{Sen}(2x)}$$

$A\ln(x)$ $\quad \frac{B}{2}\ln(x^2+1)$ $\quad C\ln(\frac{x}{1}) + C$

1) $\int \frac{2x+1}{x(x^2+1)} dx = \int \frac{A}{x} + \frac{Bx+C}{x^2+1} dx$

$\int \frac{dx}{a^2+u^2} du = \arctan\left(\frac{u}{a}\right) + C$

$$\frac{A(x^2+1) + (Bx+C)x}{x(x^2+1)}$$

$\cancel{Ax^2}$ $Ax^2 + A + Bx^2 + Cx = 2x+1$

$\underbrace{(A+B)x^2}$ $+ Cx + A = 2x + 1 + (0)x^2$

$A+B=0 \quad C=2 \quad A=1 \quad B=-1$

b) $\int \frac{1}{x^2(2x-1)} dx \rightarrow \int\left(\frac{A}{x^2} + \frac{B}{x} + \frac{C}{2x-1}\right) dx$

g) $\frac{2x-1}{x^2-1}dx \to \int \frac{2x-1}{(x^2-1)} dx = \int \frac{2x-1}{(x+1)(x-1)} dx$

$= \int \frac{A}{x+1} + \frac{B}{x-1} = A\ln(x+1) + B\ln(x-1) + C$

k) $\int \frac{dx}{(x^2+4)^{3/2}} = \int \frac{dx}{((x^2+4)^{1/2})^3} = \int \frac{2\sec^2\theta \, d\theta}{((x^2+4)^{1/2})^3}$

$\tan\theta = x/2$

$x = 2\tan\theta$

$dx = 2\sec^2\theta \, d\theta$

$\frac{\sqrt{x^2+2}}{2} = \sec\theta$

$= \int \frac{2\sec^2\theta \, d\theta}{(2\sec\theta)^3}$

$\cancel{\int \sec\theta^{-2} d\theta}$

$= \int \frac{2\sec^2\theta}{8\sec^3\theta} = 1/4 \int 1/\sec\theta \, d\theta = 1/4 \int \cos\theta \, d\theta$

$\boxed{= 1/4 \left(\frac{x}{\sqrt{x^2+4}} + C \right)}$

c) $\int x^4 \ln(3x) dx = (x^5/5)\ln(3x) - \int (x^5/5x) dx$

$\int u\,dv = uv - \int v\,du$

$u = \ln(3x)$ $\quad dv = x^4$

$du = 1/x$ $\quad v = \frac{x^5}{5}$

$= \left(\frac{x^5}{5}\right)\ln(3x) - 1/5 \int x^4 dx$

$= (x^5/5)\ln(3x) - x^5/25$

$r = kA\left(\frac{T_h - T_c}{L}\right)$ $\quad Lr = kA(T_h - T_c)$

$L = \frac{kA(T_h - T_c)}{r}$ $\quad \frac{(238)(250)(25-20)}{1200}$

$r = \frac{kAT_h - kAT_c}{kAL}$

Ave linear expansion coefficient

$\Delta L = \alpha L_i \Delta T$

$\Delta A = 2\alpha A_i \Delta T$

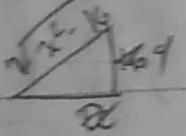
$\Delta V = 3\alpha V_i \Delta T$

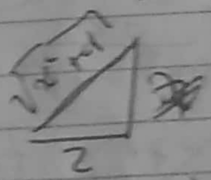
24×10^{-6}

$\frac{\Delta L}{(\alpha)L_i} = \Delta T$ $\quad \Delta T = \frac{10}{(24\times10^{-6})(100)}$

$\Delta A = 2\alpha A \Delta T$ $\quad \frac{\Delta A}{2\alpha A} = \Delta T = 2083.33$

$\Delta V = 3\alpha V \Delta T$ $\quad \frac{\Delta V}{3\alpha V} = \Delta T = 1388.88$





$$\int \frac{dx}{(x^2+4)^2} = \int \frac{dx}{((x^2+4)^{1/2})^4} = \int \frac{2\sec^2\theta\, d\theta}{(2\sec\theta)^4}$$

$x = 2\tan(\theta)$

$dx = 2\sec^2\theta\, d\theta$

$\sqrt{x^2+4} = 2\sec\theta$

$$= \int \frac{2\sec^2\theta\, d\theta}{16\sec^4\theta} = \frac{1}{8}\int \sec^{-2}\theta\, d\theta$$

$$= \frac{1}{8}\int \cos^2\theta\, d\theta = \frac{1}{8}\int \frac{1}{2} + \frac{\cos(2\theta)}{2}$$

$\cos^2\theta = 1/\sec^2\theta$

$\cos\theta = 1/\sec$

$$\frac{1}{16}\left(\int d\theta + \int \cos 2\theta\, d\theta\right) = \boxed{\frac{1}{16}\left(\theta + \frac{1}{2}\sin 2\theta\right) + C}$$

0.083

$$= \frac{1}{16}\theta + \cancel{\frac{2}{32}}\frac{1}{16}\sin\theta\cos\theta + c$$

Sigue expresarlo en x

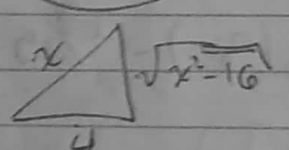
$$\cancel{= \frac{1}{16}\arctan\frac{x}{2} + \frac{1}{16}\left(\frac{x}{\sqrt{x^2+4}}\right)\left(\frac{2}{\sqrt{x^2+4}}\right)}$$

$\sin 2\theta = 2\sin\theta\cos\theta$

$$= \frac{1}{16}\arctan\left(\frac{x}{2}\right) + \frac{1}{8}\frac{x}{x^2+4} + c$$

$$= \frac{1}{16}\arctan\left(\frac{x}{2}\right) + \frac{1}{16}\left(\frac{x}{\sqrt{x^2+4}}\right)\left(\frac{2}{\sqrt{x^2+4}}\right)$$

$$\int \frac{\sqrt{x^2-16}}{x^4} = \int \frac{4\tan\theta}{(4\sec\theta)^4}\, 4\sec\theta\tan\theta\, d\theta$$



$$\frac{1}{16}\int \frac{\frac{\sin^2\theta}{\cos^2\theta}}{1/\cos^3\theta}\, d\theta = \frac{1}{16}\int \frac{\cos^3\theta\sin^2\theta}{\cos^2\theta}\, d\theta$$

$\sec = x/4$

$x = 4\sec\theta$

$$= \frac{1}{16}\int \sin^2\theta\cos\theta\, d\theta$$

$dx = 4\sec\theta\tan\theta\, d\theta$

$\sqrt{x^2-16} = 4\tan\theta$

$$= \frac{1}{16}\int u^2\, du = \frac{1}{16}\frac{\sin^3\theta}{3} + c$$

$\int u^n\, du = \frac{u^{n+1}}{n+1} + c$

$u = \sin\theta$

$du = \cos\theta\, d\theta$