(1) $\int (3x^2+2\sqrt{x}+e^{2x})\,dx$

(2) $\int e^x \operatorname{sen}(e^x)\,dx$

(3) $\int x e^{2x}\,dx$

(4) $\int \frac{2x}{3+3x^2}\,dx$

(5) $\int e^x \cos x\,dx$

(6) $\int \frac{2}{3+3x^2}\,dx$

(7) $\int \operatorname{arcsen} x\,dx$

(8) $\int \frac{2x^3+x^2-x+4}{x^2}\,dx$

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(1) $\int 3x^2+2\sqrt{x}+\frac{1}{2}e^{2x}\,dx$

$3\frac{x^3}{3}+2\frac{x^{3/2}}{3/2}+\frac{1}{2}e^{2x}+1$

$x^3+\frac{4}{3}\sqrt{x^3}+\frac{e^{2x}}{2}+C$

(2) $\int e^x \operatorname{sen}(e^x)\,dx =$

Inm. $\int f'(x)\operatorname{sen} f(x)\,dx$

$= -\cos(e^x)+C$

Sust $t=e^x$

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(3) $\int x\cdot e^{2x}\,dx$ PARTES

$u=x \qquad 1\,du=1\,dx$

$dv=e^{2x}dx \qquad v=\frac{1}{2}\int 2e^{2x}\,dx = \frac{1}{2}e^{2x}$

$x\frac{1}{2}e^{2x}-\frac{1}{2}\int \frac{1}{2}e^{2x}\,dx$

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

$e^{2x}\left[\frac{2x-1}{4}\right]+C$

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(4) $\frac{1}{3}\int \frac{3\cdot 2x}{3+3x^2}\,dx$

$\frac{1}{3}\ln|3+3x^2|+C$

$\frac{1}{3}\int \frac{2x}{1+x^2}\,dx = \frac{1}{3}\ln|1+x^2|+C$

$\frac{1}{3}\left[\ln(3(1+x^2))+C\right]$

$\frac{1}{3}\left\{\ln 3+\ln|1+x^2|+C\right\}$

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(5) $\int e^x \cos x\,dx$ PARTES

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

$dv = e^x dx \quad v = \int e^x dx = e^x$

$\cos x \cdot e^x + \int e^x \operatorname{sen} x\,dx$

$\int e^x \operatorname{sen} x\,dx$

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

$dv = e^x dx \quad v = \int e^x dx = e^x$

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

$\int e^x \cos x\,dx = \cos x e^x + \operatorname{sen} x e^x - \int e^x \cos x\,dx$

$2\int e^x \cos x\,dx = e^x(\cos x + \operatorname{sen} x)$

$\int e^x \cos x\,dx = \frac{e^x(\cos x + \operatorname{sen} x)}{2} + C$

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(6) $\int \frac{2}{3+3x^2}\,dx$

$\frac{2}{3}\int \frac{1}{1+x^2}\,dx = \frac{2}{3}\arctg x + C$

(7) $\int \underbrace{\operatorname{arcsen} x}_{u}\,\underbrace{dx}_{dv}$

$u = \operatorname{arcsen} x \quad du = \frac{1}{\sqrt{1-x^2}}\,dx$

$dv = dx \quad v = \int dx = x$

$\operatorname{arcsen} x \cdot x - \int x \frac{1}{\sqrt{1-x^2}}\,dx$

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

$x \operatorname{arcsen} x + \frac{(1-x^2)^{1/2}}{1/2} + C$

$x \operatorname{arcsen} x + \sqrt{1-x^2} + C$

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(8) $\int 2x + 1 - \frac{1}{x} + 4x^{-2}\,dx$

$2\frac{x^2}{2} + x - \ln|x| + \frac{4x^{-1}}{-1} + C$

$x^2 + x - \ln|x| - \frac{4}{x} + C$

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Integrales trigonométricas (solo tgs)

$\int \operatorname{sen}^n x \cdot \cos^m x\,dx$

① m impar ⇒ Cambio $\operatorname{sen} x = t$

② n impar ⇒ Cambio $\cos x = t$

③ m y n par ⇒ Cambio $\operatorname{tg} x = t$

①y② $\operatorname{sen}^2 x + \cos^2 x = 1$

③ $\operatorname{tg} x = t \Rightarrow (1 + \operatorname{tg}^2 x)\,dx = 1\,dt$

$dx = \frac{dt}{1+t^2}$

$1 + \operatorname{tg}^2 \alpha = \frac{1}{\cos^2 \alpha}$ $\quad \cos^2 \alpha = \frac{1}{1+t^2}$

$\operatorname{sen}^2 \alpha = 1 - \cos^2 \alpha = 1 - \frac{1}{1+t^2} = \frac{t^2}{1+t^2}$

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Excepciones

$\sin^2 x = \frac{1-\cos 2x}{2}$

$\cos^2 x = \frac{1+\cos 2x}{2}$

$\operatorname{tg}^2 x = 1+\operatorname{tg}^2 x - 1$

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$\int \cos^4 x \sin^3 x \, dx$

$\cos x = t \Rightarrow -\sin x \, dx = dt$

$dx = \frac{dt}{-\sin x}$

$\int t^4 \sin^3 x \frac{dt}{-\sin x}$

$-\int t^4 \underbrace{\sin^2 x}_{1-\cos^2 x = 1-t^2} dt$

$-\int t^4 |1-t^2| \, dt$

$-\int t^4 - t^6 \, dt$

$-\frac{t^5}{5} + \frac{t^7}{7} + C$

$-\frac{\cos^5 x}{5} + \frac{\cos^7 x}{7} + C$

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$\int \cos^5 x \, dx$

$\operatorname{sen} x = t \rightarrow \cos x \, dx = dt$

$dx = \frac{dt}{\cos x}$

$\int \cos^5 x \frac{dt}{\cos x}$

$\int \cos^4 x \, dt$

$\cos^4 x = (\cos^2 x)^2 = (1-\sin^2 x)^2 =$

$(1-t^2)^2 = 1-2t^2+t^4$

$\int 1-2t^2+t^4 \, dt$

$t - 2\frac{t^3}{3} + \frac{t^5}{5} + C$

$\sin x - \frac{2}{3}\sin^3 x + \frac{\sin^5 x}{5} + C$

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$\int \sin^2 x \cdot \cos^2 x \, dx$

$\operatorname{tg} x = t \quad (1+\operatorname{tg}^2 x)dx = dt$

$dx = \frac{dt}{1+t^2}$

$1+\operatorname{tg}^2 \alpha = \frac{1}{\cos^2 x}$

$\cos^2 x = \frac{1}{1+\operatorname{tg}^2 x} = \frac{1}{1+t^2}$

$\sin^2 x = 1-\cos^2 x = 1-\frac{1}{1+t^2} = \frac{t^2}{1+t^2}$

$\int t^2$

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$$\int \frac{t^2}{1+t^2}\,\frac{1}{1+t^2}\,\frac{dt}{1+t^2}$$

$$\int \frac{t^2}{(1+t^2)^3}\,dt \Rightarrow \text{RACIONAL}$$

mar 15-13:47

Excepción

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

$$\cos 2x = \cos^2 x - \operatorname{sen}^2 x$$

$$\cos 2x = 1 - \operatorname{sen}^2 x - \operatorname{sen}^2 x$$

$$\cos 2x = 1 - 2\operatorname{sen}^2 x$$

$$\operatorname{sen}^2 x = \frac{1-\cos 2x}{2}$$

$$\int \frac{1-\cos 2x}{2}\,dx = \frac{1}{2}\int 1-\cos 2x\,dx$$

$$\frac{1}{2}\left[x - \frac{1}{2}\operatorname{sen} 2x\right] + C$$

$$\frac{x}{2} - \frac{1}{4}\operatorname{sen} 2x + C$$

mar 15-13:47

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

$$\cos 2x = \cos^2 x - \operatorname{sen}^2 x$$

$$\cos 2x = \cos^2 x - (1-\cos^2 x)$$

$$\cos 2x = 2\cos^2 x - 1$$

$$\cos^2 x = \frac{1+\cos 2x}{2}$$

$$\int \frac{1+\cos 2x}{2}\,dx = \ldots \text{Acaban}$$

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$$\int \operatorname{tg}^2 x\,dx$$

$$\int \operatorname{tg}^2 x + 1 - 1\,dx$$

$$\int (\operatorname{tg}^2 x + 1)\,dx - \int 1\,dx$$

$$\operatorname{tg} x - x + C$$

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Deberes

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

2) $\int \frac{\sin^2 x}{\cos^5 x} \, dx$

3) $\int \frac{1}{\sin^2 x \cdot \cos^2 x} \, dx$

4) $\int \frac{\sin^3 x}{\cos^5 x} \, dx$

5) $\int \cos^7 x \, dx$

6) $\int tg^2 x \, dx$

7) $\int \frac{\cos x}{\sin^5 x} \, dx$

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