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

mar 15-13:41

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

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

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

$\int f'(x)\cos f(x)\,dx = \operatorname{sen} f(x)$

mar 18-14:06

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

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

$\int \frac{t^2}{\cos^5 x}\,\frac{dt}{\cos x}$

$\int \frac{t^2}{\cos^6 x}\,dt$

$\cos^6 x = (\cos^2 x)^3 = (1-\sin^2 x)^3 = (1-t^2)^3$

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

$\frac{a+b}{c} = \frac{a}{c} + \frac{b}{c}$

$\frac{a}{b+c} = \frac{a}{b} + \frac{a}{c}$

mar 18-14:08

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

$tg\,x = t \qquad (1+tg^2 x)\,dx = dt$

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

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

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

$\int$

mar 18-14:10

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

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

$$\int (t^{-2}+1)\,dt = \frac{t^{-1}}{-1} + t + C$$

$$-\frac{1}{tg\,x} + tg\,x + C$$

mar 18-14:13

$$\int \frac{\operatorname{sen}^3 x}{\cos^5 x}\,dx$$

$\operatorname{sen} x = t$

$\cos x\,dx = dt$

$$\int \frac{t^3}{\cos^5 x}\,\frac{dt}{\cos x} = \int \frac{t^3}{\cos^6 x}\,dt$$

$\cos^6 x = (\cos^2 x)^3 = (1-t^2)^3$

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

mar 18-14:15

$$\int \frac{\operatorname{sen}^3 x}{\cos^5 x}\,dx$$

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

$$\int \frac{\operatorname{sen}^3 x}{t^5}\,\frac{dt}{-\operatorname{sen} x} =$$

$$-\int \frac{\operatorname{sen}^2 x}{t^5}\,dt$$

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

$$-\int \frac{1-t^2}{t^5}\,dt \quad \text{RACIONAL}$$

$$-\int t^{-5} - t^{-3}\,dt = -\frac{t^{-4}}{-4} + \frac{t^{-2}}{-2} + C$$

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

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Trig: Impar en seno y cos

Busco el que está elevado a mayor grado $t =$ ____

$$\int \operatorname{sen}^3 x \cos^5 x\,dx \to t = \cos x$$

mar 18-14:20

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

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

$\int \cos^7 x \frac{dt}{\cos x} = \int \cos^6 x\,dt$

$\cos^6 x = (\cos^2 x)^3 = (1-\operatorname{sen}^2 x)^3 =$

$(1-t^2)^3$

$\int (1-t^2)^3\,dt = \int 1-3t^2+3t^4-t^6\,dt$

$t - 3\frac{t^3}{3} + 3\frac{t^5}{5} - \frac{t^7}{7} + C$

$\operatorname{sen} x - \operatorname{sen}^3 x + \frac{3}{5}\operatorname{sen}^5 x - \frac{\operatorname{sen}^7 x}{7} + C$

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

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

(7) $\int \frac{\cos x}{\operatorname{sen}^5 x}\,dx$

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

$\int \frac{\cos x}{t^5}\frac{dt}{\cos x} = \int t^{-5}\,dt$

$\frac{t^{-4}}{-4} + C = -\frac{1}{4\operatorname{sen}^4 x} + C$

mar 18-14:25

Integrales con raíces

(1) Transformar en sumas.

(2) Inmediatas.

- $\int f'(x)\,f(x)^n\,dx = \frac{f(x)^{n+1}}{n+1} + C$ (Derivada de lo de dentro)
- $\int \frac{f'(x)}{\sqrt{1-[f(x)]^2}}\,dx = \operatorname{arcsen} f(x) + C$

(3) Sustitución "lo de dentro de la raíz = t" (m.c.m. de los índices de la raíz)

(4) $\int \sqrt{a^2-b^2x^2}\,dx \Rightarrow bx = a\cdot\operatorname{sen} t$

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(5) $\int \frac{2+3x^2}{\sqrt{x}}\,dx = \int 2x^{-1/2} + 3x^{3/2}\,dx$

$2\frac{x^{1/2}}{1/2} + 3\cdot\frac{x^{5/2}}{5/2} + C$

$4\sqrt{x} + \frac{6}{5}\sqrt{x^5} + C$

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

$\int 3x\,(x^2+2)^{-1/2}\,dx$

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

$\frac{3}{2}\,\frac{(x^2+2)^{1/2}}{1/2}+C = 3\sqrt{x^2+2}+C$

mar 18-14:33

(3) $\int \frac{x}{\sqrt{1-x^4}}\,dx$

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

$\frac{1}{2}\arcsin x^2 + C$

mar 18-14:34

(4) $\int \frac{dx}{(1+x)\sqrt{x}}$

$x = t^2 \longrightarrow dx = 2t\,dt$

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

$2\int \frac{1}{1+t^2}\,dt = 2\operatorname{arctg} t + C$

$2\operatorname{arctg}\sqrt{x} + C$

mar 18-14:35

$\int \frac{\sqrt{x}+\sqrt[3]{x}}{2}\,dx$

$\int \frac{2}{\sqrt{x+1}+\sqrt[3]{x+1}}\,dx$

$x+1 = t^6 \quad dx = 6t^5\,dt$

$\int \frac{2}{\sqrt{t^6}+\sqrt[3]{t^6}}\,6t^5\,dt$

$\int \frac{12t^5}{t^3+t^2}\,dt$ RACIONAL

mar 18-14:37

$\int \sqrt{4-x^2}\,dx$

$4-x^2=t^2$

$-2x\,dx=2t\,dt$

$dx=\frac{t\,dt}{x}$

$\int \sqrt{t^2}\,\frac{t\,dt}{x}$

$\int \frac{t^2\,dt}{x}=\int \frac{t^2\,dt}{\sqrt{4-t^2}}$

YA NO SE HACE

mar 18-14:40

$\int \sqrt{4-x^2}\,dx$

$\int \sqrt{a^2-b^2x^2}\,dx \Rightarrow bx=a\operatorname{sen} t$

$a=2,\ b=1 \Rightarrow 1.x=2\operatorname{sen} t$

$dx=2\cos t\,dt$

$\int \sqrt{4-4\operatorname{sen}^2 t}\ 2\cos t\,dt$

$\int \sqrt{4(1-\operatorname{sen}^2 t)}\ 2\cos t\,dt$

$\int 2\sqrt{\cos^2 t}\cdot 2\cos t\,dt$

$4\int \cos^2 t\,dt=4\int \frac{1+\cos 2t}{2}\,dt$ ...

mar 18-14:42

$\int \frac{2}{\sqrt{9-5x^2}}\,dx$

$\int \frac{f'(x)\to 5^{\circ}}{\sqrt{1-[f(x)]^2}}\,dx=\operatorname{arc\,sen} f(x)+C$

$1^{\circ}\quad 2^{\circ}$

$\frac{1}{\sqrt{9}}\int \frac{2}{\sqrt{\frac{9-5x^2}{9}}}\,dx$

$\frac{1}{3}\int \frac{2}{\sqrt{1-\frac{5x^2}{9}}}\,dx=\frac{3}{3\sqrt{5}}\int_{(2)}^{\sqrt{5}/3} \frac{}{\sqrt{1-\left(\frac{\sqrt{5}x}{3}\right)^2}}$

$\frac{2}{3\sqrt{5}}\operatorname{arsen}\left(\frac{\sqrt{5}x}{3}\right)+C$

$\frac{2}{\sqrt{5}}\operatorname{arcsen}\left(\frac{\sqrt{5}x}{3}\right)+C$

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Deberes

(1) $\int \sqrt{(x+3)5}\,dx$

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

(3) $\int \frac{x\,dx}{\sqrt{x^2+5}}$

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

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

(6) $\int \sqrt{9-4x^2}\,dx$

(7) $\int \frac{x+3}{\sqrt{9-x^2}}\,dx$

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