Clase 18-05

martes, 18 de mayo de 2021 06:46 p. m.

Integrales → indefinidas ✓
→ definidas
→ impropias

Ej

$f(x) = 6x^2$ —derivar→ $f'(x) = 12x$ Resp.

$f'(x) = 12x$ —Integración→ $f(x) = 6x^2$

derivado

$f(x) = x^3$.

$F(x) = \frac{x^4}{4}$ ✓ → Primitiva.

$F'(x) = \frac{4x^3}{4}$

$F'(x) = x^3$

$F(x) = \frac{x^4}{4} + 2$ ✓

$F'(x) = x^3$

$F(x) = \frac{x^4}{4} - 100$ ✓

$F(x) = \frac{x^4}{4} + C$

$\int x^3 dx = \frac{x^4}{4} + C$

* $f(x) = \operatorname{sen} x$

$F(x) = -\cos x$ vari

$F'(x) = -(-\operatorname{sen} x) = \operatorname{sen} x$ ✓

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

* $f(x) = x^8$

$F(x) = \frac{x^9}{9}$ ✓ → $F(x) = \frac{1}{9}x^9$

$F'(x) = \frac{9x^8}{9} = x^8$

$F'(x) = \frac{1}{9} 9x^8 = x^8$ ✓

$\int x^8 dx = \frac{x^9}{9} + C$

* $f(x) = x^{10}$

$F(x) = \frac{x^{11}}{11}$

$F'(x) = \frac{11x^{10}}{11} = x^{10}$ ✓

$$\arcsen\left[(\sen x)\right] = x$$

$$\ln e^x = x$$

$$e^{\ln x} = x$$

$$\int 5x^4\,dx = 5\int x^4\,dx \qquad \int (5 + x^4)\,dx$$

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

$$\int (x^4 \pm x^6)\,dx = \int x^4\,dx \pm \int x^6\,dx$$

$$\int x^4 \cdot \sen x\,dx = \int x^4\,dx \cdot \int \sen x\,dx$$

Elementales.

1:- $\int dx = x + C$

2:- $\int x^n\,dx = \frac{x^{n+1}}{n+1} + C \quad n \in \mathbb{R},\ n \neq -1$

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

4:- $\int a^x\,dx = \frac{a^x}{\ln a} + C \quad a \in \mathbb{R}^+$

5:- $\int e^x\,dx = \frac{e^x}{\ln e} = e^x + C$

6:- $\int \sen x\,dx = -\cos x + C$

$$\int x^{-6}\,dx = \frac{x^{-6+1}}{-6+1} = \frac{x^{-5}}{-5} + C$$

$$\int x^{0.1}\,dx = \frac{x^{0.1+1}}{0.1+1} + C = \frac{x^{1.1}}{1.1} + C$$

$$\int x^{\frac{3}{4}}\,dx = \frac{x^{\frac{7}{4}}}{\frac{7}{4}} + C = \frac{4}{7}x^{\frac{7}{4}} + C.$$

6:- $\int \operatorname{sen} x\,dx = -\cos x + C$

7:- $\int \cos x\,dx = \operatorname{sen} x + C$

8:- $\int \sec^2 x\,dx = \tan x + C$

9:- $\int \sec x \tan x\,dx = \sec x + C.$

10:-

11:-

$$\int \sqrt[3]{x^4}\,dx = \int x^{\frac{4}{3}}\,dx = \frac{x^{\frac{7}{3}}}{\frac{7}{3}} + C$$

$$\int \frac{1}{x^{1/2}}\,dx \qquad = \frac{3}{7}x^{7/3} + C$$

$$\int x^{-1/2}\,dx = \frac{x^{1/2}}{\frac{1}{2}} + C$$

$$= 2x^{1/2} + C$$

$$\int 4^x\,dx = \frac{4^x}{\ln 4} + C$$

Ejemplos $\int (x-4)^3\,dx = \int (x^3 - 3x^2 4 + 3x 4^2 - 4^3)\,dx$

$$= \int (x^3 - 12x^2 + 48x - 64)\,dx$$

$$= \int x^3\,dx - \int 12x^2\,dx + \int 48x\,dx - \int 64\,dx$$

$$= \int x^3\,dx - 12\int x^2\,dx + 48\int x\,dx - 64\int dx$$

$$= \frac{x^4}{4} - 12\frac{x^3}{3} + 48\frac{x^2}{2} - 64x + C$$

$$= \frac{x^4}{4} - 4x^3 + 24x^2 - 64x + C$$

$16/3$

$C + C = C$

alg.

2- $\int \left(\frac{5\sqrt[7]{x^2} - 6\sqrt{x} + 4}{\sqrt[3]{x}} \right) dx$

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

$$\int \left(\frac{5\sqrt[7]{x^2}}{\sqrt[8]{x}} - \frac{6\sqrt{x}}{\sqrt[8]{x}} + \frac{4}{\sqrt[8]{x}} \right) dx$$

$$\frac{a^n}{a^m} = a^{n-m}$$

$$a^n \cdot a^m = a^{n+m}$$

1 $$\int \left(\frac{5x^{2/7}}{x^{1/8}} - \frac{6x^{1/2}}{x^{1/8}} + \frac{4}{x^{1/8}} \right) dx$$

$$\frac{2}{7} - \frac{1}{8} = \frac{9}{56}$$

$$\frac{1}{2} - \frac{1}{8} = \frac{6}{16} = \frac{3}{8}$$

2 $$\int \left(5x^{9/56} - 6x^{3/8} + 4x^{-1/8} \right) dx$$

3 $$5\int x^{9/56}\,dx - 6\int x^{3/8}\,dx + 4\int x^{-1/8}\,dx$$

4 $$= 5\frac{x^{65/56}}{\frac{65}{56}} - 6\frac{x^{11/8}}{\frac{11}{8}} + 4\frac{x^{7/8}}{\frac{7}{8}} + C$$

$$\frac{9}{56} + 1$$

$$-\frac{1}{8} + 1$$

$$\frac{5}{\frac{65}{56}}$$

5 $$= \frac{5 \cdot 56}{65} x^{65/56} - \frac{48x^{11/8}}{11} + 32\frac{x^{7/8}}{7} + C$$

$$= 56\frac{x^{65/56}}{13} - \frac{48x^{11/8}}{11} + 32\frac{x^{7/8}}{7} + C$$

Mato

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

En los ejercicios 15 a 34, encontrar la integral indefinida y verificar el resultado mediante derivación.

15. $\int (x + 7)\,dx$
16. $\int (13 - x)\,dx$
17. $\int (2x - 3x^2)\,dx$
18. $\int (8x^3 - 9x^2 + 4)\,dx$
19. $\int (x^5 + 1)\,dx$
20. $\int (x^3 - 10x - 3)\,dx$
21. $\int (x^{3/2} + 2x + 1)\,dx$
22. $\int \left(\sqrt{x} + \frac{1}{2\sqrt{x}} \right) dx$
23. $\int \sqrt[3]{x^2}\,dx$
24. $\int \left(\sqrt[4]{x^3} + 1 \right) dx$
25. $\int \frac{1}{x^5}\,dx$
26. $\int \frac{1}{x^6}\,dx$
27. $\int \frac{x + 6}{\sqrt{x}}\,dx$
28. $\int \frac{x^2 + 2x - 3}{x^4}\,dx$
29. $\int (x + 1)(3x - 2)\,dx$
30. $\int (2t^2 - 1)^2\,dt$
31. $\int y^2\sqrt{y}\,dy$
32. $\int (1 + 3t)t^2\,dt$

29. $\int (x+1)(3x-2)\,dx$

30. $\int (2t^2-1)^2\,dt$

31. $\int y^2\sqrt{y}\,dy$

32. $\int (1+3t)t^2\,dt$

33. $\int dx$

34. $\int 14\,dt$