

Taller 2

$$1) \int x e^{3x} dx$$

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

$$u = x = du = dx$$

$$du = e^{3x} = v = \frac{1}{3} e^{3x}$$

$$\int x e^{3x} dx = uv - \int v du$$

$$= x \cdot \frac{1}{3} e^{3x} - \int \frac{1}{3} e^{3x} dx$$

$$= \frac{1}{3} x e^{3x} - \frac{1}{3} \int e^{3x} dx$$

$$= \frac{1}{3} x e^{3x} - \frac{1}{3} \cdot \frac{1}{3} e^{3x}$$

$$= \frac{1}{3} x e^{3x} - \frac{1}{9} e^{3x} + C$$



3)

$$\int x \sec(x) \tan(x) dx$$

$$u = x = du = dx$$

$$dv = \sec(x) \tan(x) dx = v = \sec(x)$$

$$= x \cdot \sec(x) - \int \sec(x) \cdot dx$$

$$= x \sec(x) - \int \sec(x) dx$$

$$= \int \sec(x) dx = \ln|\sec(x) + \tan(x)| + C$$

$$5) \int \ln(sx) dx$$

$$= \int \ln(sx) dx = \int (\ln(s) + \ln(x)) dx = \ln(s) \cdot x +$$

$$\int \ln(x) dx$$

$$u = \ln(x) \quad du = \frac{1}{x} dx$$

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

$$\int \ln(x) dx = x \ln(x) - x + C$$



$$7) \int \frac{(\ln(t))^2}{t} dt$$

$$u = \ln(t) \quad du = \frac{1}{t} dt$$

$$\int \frac{\ln(t)^2}{t} dt = \int u^2 du = \frac{u^3}{3} + C = \frac{(\ln(t))^3}{3} + C$$

$$9) \int x \tan^{-1} x dx$$

$$u = \tan^{-1} x \quad du = \frac{1}{1+x^2} dx$$

$$dv = x dx \quad v = \frac{x^2}{2}$$

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

$$\frac{x^2}{2(1+x^2)} = \frac{1}{2} \left(1 - \frac{1}{1+x^2} \right)$$

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

$$= \frac{1}{2} (x - \tan^{-1} x)$$

$$\frac{x^2}{2} \tan^{-1} x - \frac{1}{2} \tan^{-1} x + C.$$

$$11) \int \sin(\ln y) dy$$

$$u = \ln(y) \quad dy = y dy = e^u du$$

$$\int \sin(\ln y) dy = \int \sin(u) \cdot e^u du$$

$$u_1 = \sin(u) \quad du_1 = \cos(u) du$$

$$dv = e^u du \quad v = e^u$$

$$\begin{aligned} & \frac{1}{2} e^{\ln y} (\sin(\ln y) - \cos(\ln y)) + C \\ &= \frac{y}{2} (\sin(\ln y) - \cos(\ln y)) + C. \end{aligned}$$

$$13) \int \frac{x e^{-x}}{(x+1)^2} dx$$

$$u = x+1 \quad x = u-1 \quad dx = du$$

$$\int \frac{(u-1) e^{-(u-1)}}{u^2} du = \int \frac{(u-1) e^{-1-u}}{u^2} du = e^u$$

$$\int \frac{(u-1) e^{-u}}{u^2} du$$



$$15) \int e^x \cos(x) dx$$

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

$$17) \int \frac{x^3}{\sqrt{1-x^2}} dx$$

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

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

$$x^3 dx = -\frac{(1-u)\sqrt{1-u}}{2} du$$

$$19) \int x^2 \sin(n)x dx$$

$$u = x^2 \quad du = 2x dx$$

$$du = \sin(n)x dx \quad v = \cos(n)x$$

$$\int x^2 \sin(n)x dx = x^2 \cos(n)x - \int 2x \cos(n)x dx$$

$$x^2 \cos(n)x - 2x \sin(n)x + 2 \cos(n) + C.$$



$$21) \int \frac{\cot^{-1} \left(\frac{\sqrt{z}}{\sqrt{2}} \right)}{\sqrt{z}} dz$$

$$u = \frac{\sqrt{z}}{\sqrt{2}} \quad z = 2u^2, \quad dz = 4u du$$

$$\frac{\cot^{-1}(u)}{\sqrt{z}} dz = \frac{\cot^{-1}(u)}{\sqrt{2u}} \cdot 4u du = \frac{4}{\sqrt{2}} \cot^{-1}(u) du$$

$$= 2\sqrt{2} \int \cot^{-1}(u) du = 2\sqrt{2} \left(u \cot^{-1}(u) + \frac{1}{2} \ln(1+u^2) \right) + C$$

$$\sqrt{2} \left(-\frac{\sqrt{z}}{\sqrt{2}} \cot^{-1} \frac{\sqrt{z}}{\sqrt{2}} + \frac{1}{2} \ln \left(1 + \frac{z}{2} \right) \right) + C.$$

$$23) \int \frac{\cos(x)}{\sqrt{x}} dx$$

$$u = \sqrt{x} \quad x = u^2, \quad dx = 2u du$$

$$\int \frac{\cos(x)}{\sqrt{x}} dx = \int \frac{\cos(u^2)}{u} \cdot 2u du = 2 \int \cos(u^2) du$$



TALLER # 1
CALCULO INTEGRAL

1. $\int \sqrt{1 - 4y} dy$
2. $\int \sqrt[3]{3x - 4} dx$
3. $\int x \sqrt[3]{x^2 - 9} dx$
4. $\int x(2x^2 + 1)^6 dx$
5. $\int x^2(x^3 - 1)^{10} dx$
6. $\int 3x \sqrt{4 - x^2} dx$
7. $\int \frac{y^3}{(1 - 2y^4)^5} dy$
8. $\int \frac{s}{\sqrt{3s^2 + 1}} ds$
9. $\int (x^2 - 4x + 4)^{4/3} dx$
10. $\int x^4 \sqrt{3x^5 - 5} dx$
11. $\int x \sqrt{x + 2} dx$
12. $\int \frac{t}{\sqrt{t + 3}} dt$
13. $\int \frac{2r}{(1 - r)^7} dr$
14. $\int x^3(2 - x^2)^{12} dx$
15. $\int \sqrt{3 - 2x} x^2 dx$
16. $\int (x^3 + 3)^{1/4} x^5 dx$
17. $\int \cos 4\theta d\theta$
18. $\int \operatorname{sen} \frac{1}{3} x dx$
19. $\int 6x^2 \operatorname{sen} x^3 dx$
20. $\int \frac{1}{2} t \cos 4t^2 dt$
21. $\int \sec^2 5x dx$
22. $\int \csc^2 2\theta d\theta$
23. $\int y \csc 3y^2 \cot 3y^2 dy$
24. $\int r^2 \sec^2 r^3 dr$
25. $\int \cos x(2 + \operatorname{sen} x)^5 dx$
26. $\int \frac{4 \operatorname{sen} x}{(1 + \cos x)^2} dx$
27. $\int \sqrt{1 + \frac{1}{3x}} \frac{dx}{x^2}$
28. $\int \sqrt{\frac{1}{t} - 1} \frac{dt}{t^2}$
29. $\int 2 \operatorname{sen} x \sqrt[3]{1 + \cos x} dx$
30. $\int \operatorname{sen} 2x \sqrt{2 - \cos 2x} dx$
31. $\int \cos^2 t \operatorname{sen} t dt$
32. $\int \operatorname{sen}^3 \theta \cos \theta d\theta$
33. $\int (\tan 2x + \cot 2x)^2 dx$
34. $\int \frac{\sec^2 3\sqrt{t}}{\sqrt{t}} dt$
35. $\int \frac{x^2 + 2x}{\sqrt{x^3 + 3x^2 + 1}} dx$

TALLER # 1
CALCULO INTEGRAL

36. $\int x(x^2 + 1) \sqrt{4 - 2x^2 - x^4} dx$

37. $\int \frac{y+3}{(3-y)^{2/3}} dy$

38. $\int \sqrt{3+s}(s+1)^2 ds$ 39. $\int \frac{r^{1/3}+2)^4}{\sqrt[3]{r^2}} dr$

40. $\int \left(t + \frac{1}{t}\right)^{3/2} \left(\frac{t^2 - 1}{t^2}\right) dt$

41. $\int \frac{x^3}{(x^2 + 4)^{3/2}} dx$ 42. $\int \frac{x^3}{\sqrt{1 - 2x^2}} dx$

43. $\int \sin x \sin(\cos x) dx$

44. $\int \sec x \tan x \cos(\sec x) dx$