

## Taller 2

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

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



$$u = x \quad dv = e^{3x}$$

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

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

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

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

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

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





3)

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

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

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

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

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

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

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

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

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

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

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

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





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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

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

$$\frac{1}{2} e^{\ln y} (\sin(\ln y) - \cos(\ln y)) + C$$

$$= \frac{y}{2} (\sin(\ln y) - \cos(\ln y)) + C.$$

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

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

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

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



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

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

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

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

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

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

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

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

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

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





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

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

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

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

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

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

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

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



TALLER # 1  
CALCULO INTEGRAL

1.  $\int \sqrt{4-4y} \, dy$
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.  $\int \sin \frac{1}{3} x \, dx$
19.  $\int 6x^2 \sin x^3 \, dx$
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.  $\int \cos x(2+\sin x)^5 \, dx$
26.  $\int \frac{4 \sin x}{(1+\cos x)^2} \, dx$
27.  $\int \sqrt{1+\frac{1}{3x}} \frac{dx}{x^2}$
28.  $\int \sqrt{\frac{1}{t}-1} \frac{dt}{t^2}$
29.  $\int 2 \sin x \sqrt[3]{1+\cos x} \, dx$
30.  $\int \sin 2x \sqrt{2-\cos 2x} \, dx$
31.  $\int \cos^2 t \sin t \, dt$
32.  $\int \sin^3 \theta \cos \theta \, d\theta$
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

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

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

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

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

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

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

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