

## Problemas de integrales

### 2º de Bachillerato

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Comprueba el valor de las siguientes integrales resolviéndolas por partes:

$$1. \int x e^{2x} dx = \frac{(2x-1)e^{2x}}{4} + C$$

$$2. \int x^2 e^{2x} dx = \frac{(2x^2 - 2x + 1)e^{2x}}{4} + C$$

$$3. \int x e^{x^2} dx = \frac{e^{x^2}}{2} + C$$

$$4. \int x^2 e^{x^3} dx = \frac{e^{x^3}}{3} + C$$

$$5. \int x e^{-2x} dx = -\frac{(2x+1)e^{-2x}}{4} + C$$

$$6. \int \frac{x}{e^x} dx = -(x+1)e^{-x} + C$$

$$7. \int x^3 \ln x dx = \frac{(4 \ln x - 1)x^4}{16} + C$$

$$8. \int x^2 \ln x dx = \frac{(3 \ln x - 1)x^3}{9} + C$$

$$9. \int x^3 e^x dx = (x^3 - 3x^2 + 6x - 6)e^x + C$$

$$10. \int \frac{e^{1/x}}{x^2} dx = -e^{1/x} + C$$

$$11. \int x \ln(x+1) dx = \frac{2(x^2-1) \ln(x+1) - x(x-2)}{4} + C$$

$$12. \int \frac{1}{x(\ln x)^3} dx = -\frac{1}{2(\ln x)^2} + C$$

$$13. \int (\ln x)^2 dx = x((\ln x)^2 - 2 \ln x + 2) + C$$

$$14. \int \ln 3x dx = x(\ln x - 3) + C$$

$$15. \int \frac{(\ln x)^2}{x} dx = \frac{(\ln x)^3}{3} + C$$

16.  $\int \frac{\ln x}{x^2} dx = -\frac{\ln x + 1}{x} + C$
17.  $\int \frac{x e^{2x}}{(2x + 1)^2} dx = \frac{e^{2x}}{4(2x + 1)} + C$
18.  $\int \frac{x^3 e^{x^2}}{(x^2 + 1)^2} dx = \frac{e^{x^2}}{2(x^2 + 1)} + C$
19.  $\int x \sqrt{x - 1} dx = \frac{2(x - 1)^{3/2}(3x + 2)}{15} + C$
20.  $\int x^2 \sqrt{x - 1} dx = \frac{2(x - 1)^{3/2}(15x^2 + 12x + 8)}{105} + C$
21.  $\int (x^2 - 1)e^x dx = e^x(x^2 - 2x + 1) + C$
22.  $\int \frac{\ln 2x}{x^2} dx = -\frac{\ln 2x + 1}{x} + C$
23.  $\int \ln x dx = x(\ln x - 1) + C$
24.  $\int \frac{x}{\sqrt{2 + 3x}} dx = \frac{2(3x - 4)\sqrt{3x + 2}}{27} + C$
25.  $\int x \cos x dx = \cos x + x \sin x + C$
26.  $\int x^2 \cos x dx = 2x \cos x + (x^2 - 2) \sin x + C$
27.  $\int x \sec^2 x dx = \ln(\cos x) + x \tan x + C$
28.  $\int x \sec x \tan x dx = \frac{x}{\cos x} - \ln\left(\tan\left(\frac{2x + \pi}{4}\right)\right) + C$
29.  $\int \arcsin 2x dx = \frac{2x \arcsin 2x + \sqrt{1 - 4x^2}}{2} + C$
30.  $\int \arccos x dx = -\frac{2x \arcsin x + 2\sqrt{1 - x^2} - x\pi}{2} + C$
31.  $\int \arctan x dx = \frac{2x \arctan x - \ln(x^2 + 1)}{2} + C$
32.  $\int \arctan \frac{x}{2} dx = x \arctan \frac{x}{2} - \ln(x^2 + 4) + C$
33.  $\int e^{2x} \sin x dx = \frac{(2 \sin x - \cos x)e^{2x}}{5} + C$

34.  $\int e^x \cos 2x \, dx = \frac{(2 \sin 2x + \cos 2x)e^x}{5} + C$
35.  $\int x \sin 2x \, dx = \frac{\sin 2x - 2x \cos 2x}{4} + C$
36.  $\int x \arcsin x^2 \, dx = \frac{x^2 \arcsin x^2 + \sqrt{1 - x^4}}{2} + C$
37.  $\int e^x \sin x \, dx = \frac{(\sin x - \cos x)e^x}{2} + C$
38.  $\int x^2 e^{3x} \, dx = \frac{e^{3x}(9x^2 - 6x + 2)}{27} + C$
39.  $\int x^2 \cos x \, dx = 2x \cos x + (x^2 - 2) \sin x + C$
40.  $\int \ln(1 + x^2) \, dx = 2 \arctan x + x \ln(x^2 + 1) - 2x + C$
41.  $\int 2x\sqrt{2x - 3} \, dx = \frac{2(x + 1)(2x - 3)^{3/2}}{5} + C$
42.  $\int x\sqrt{4 + x} \, dx = \frac{2(3x - 8)(x + 4)^{3/2}}{15} + C$
43.  $\int \frac{x^3}{\sqrt{4 + x^2}} \, dx = \frac{(x^2 - 8)\sqrt{x^2 + 4}}{3} + C$
44.  $\int x\sqrt{4 - x} \, dx = -\frac{2(3x + 8)(4 - x)^{3/2}}{15} + C$