

PROBLEMAS

Verificar las siguientes integraciones.

$$1. \int x^4 dx = \frac{x^5}{5} + C.$$

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

$$3. \int x^{2/3} dx = \frac{3}{5} x^{5/3} + C.$$

$$4. \int \frac{dx}{\sqrt{x}} = 2\sqrt{x} + C.$$

$$5. \int \frac{dx}{\sqrt[3]{x}} = \frac{3}{2} x^{2/3} + C.$$

$$6. \int 3ay^2 dy = ay^3 + C.$$

$$7. \int \frac{2}{t^2} dt = -\frac{2}{t} + C.$$

$$9. \int \frac{dx}{\sqrt{2x}} = \sqrt{2x} + C.$$

$$8. \int \sqrt{ax} dx = \frac{2x\sqrt{ax}}{3} + C.$$

$$10. \int \sqrt[3]{3t} dt = \frac{(3t)^{4/3}}{4} + C.$$

$$11. \int (x^{3/2} - 2x^{2/3} + 5\sqrt{x} - 3) dx = \frac{2x^{5/2}}{5} - \frac{6x^{5/3}}{5} + \frac{10x^{3/2}}{3} - 3x + C.$$

$$12. \int \frac{4x^2 - 2\sqrt{x}}{x} dx = 2x^2 - 4\sqrt{x} + C.$$

$$13. \int \left(\frac{x^2}{2} - \frac{2}{x^2} \right) dx = \frac{x^3}{6} + \frac{2}{x} + C.$$

$$14. \int \sqrt{x}(3x - 2) dx = \frac{6x^{5/2}}{5} - \frac{4x^{3/2}}{3} + C.$$

$$15. \int \frac{x^3 - 6x + 5}{x} dx = \frac{x^3}{3} - 6x + 5 \ln x + C.$$

$$16. \int \sqrt{a + bx} dx = \frac{2(a + bx)^{3/2}}{3b} + C.$$

$$17. \int \frac{dy}{\sqrt{a - by}} = -\frac{2\sqrt{a - by}}{b} + C.$$

$$18. \int (a + bt)^2 dt = \frac{(a + bt)^3}{3b} + C.$$

$$19. \int x(2 + x^2)^2 dx = \frac{(2 + x^2)^3}{6} + C.$$

$$20. \int y(a - by^2) dy = -\frac{(a - by^2)^2}{4b} + C.$$

$$21. \int t\sqrt{2t^2 + 3} dt = \frac{(2t^2 + 3)^{3/2}}{6} + C.$$

$$22. \int x(2x + 1)^2 dx = x^4 + \frac{4x^3}{3} + \frac{x^2}{2} + C.$$

$$23. \int \frac{4x^2 dx}{\sqrt{x^3 + 8}} = \frac{8\sqrt{x^3 + 8}}{3} + C.$$

$$24. \int \frac{6z dz}{(5 - 3z^2)^2} = \frac{1}{5 - 3z^2} + C.$$

$$25. \int (\sqrt{a} - \sqrt{x})^2 dx = ax - \frac{4x\sqrt{ax}}{3} + \frac{x^2}{2} + C.$$

$$26. \int \frac{(\sqrt{a} - \sqrt{x})^2 dx}{\sqrt{x}} = -\frac{2(\sqrt{a} - \sqrt{x})^3}{3} + C.$$

$$27. \int \sqrt{x}(\sqrt{a} - \sqrt{x})^2 dx = \frac{2ax^{3/2}}{3} - x^2\sqrt{a} + \frac{2x^{5/2}}{5} + C.$$

$$(28.) \int \frac{t^3 dt}{\sqrt{a^4 + t^4}} = \frac{\sqrt{a^4 + t^4}}{2} + C.$$

$$29. \int \frac{dy}{(a + by)^3} = -\frac{1}{2b(a + by)^2} + C.$$

$$(30.) \int \frac{x dx}{(a + bx^2)^3} = -\frac{1}{4b(a + bx^2)^2} + C.$$

$$31. \int \frac{t^2 dt}{(a + bt^3)^2} = -\frac{1}{3b(a + bt^3)} + C.$$

$$32. \int z(a + bz^3)^2 dz = \frac{a^2 z^2}{2} + \frac{2abz^5}{5} + \frac{b^2 z^8}{8} + C.$$

$$(33.) \int x^{n-1} \sqrt{a + bx^n} dx = \frac{2(a + bx^n)^{3/2}}{3nb} + C.$$

$$34. \int \frac{(2x+3)dx}{\sqrt{x^2+3x}} = 2\sqrt{x^2+3x} + C.$$

$$(35.) \int \frac{(x^2+1)dx}{\sqrt{x^3+3x}} = \frac{2\sqrt{x^3+3x}}{3} + C.$$

$$36. \int \frac{(2 + \ln x)dx}{x} = \frac{(2 + \ln x)^2}{2} + C.$$

$$(37.) \int \sin^2 x \cos x dx$$

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

SUGESTION. Emplear (4), haciendo $v = \sin x$, $dv = \cos x dx$, $n = 2$.

$$(38.) \int \sin ax \cos ax dx = \frac{\sin^2 ax}{2a} + C.$$

$$39. \int \sin 2x \cos^2 2x dx = -\frac{\cos^3 2x}{6} + C.$$

$$40. \int \operatorname{tg} \frac{x}{2} \sec^2 \frac{x}{2} dx = \operatorname{tg}^2 \frac{x}{2} + C.$$

$$41. \int \frac{\cos ax dx}{\sqrt{b + \sin ax}} = \frac{2\sqrt{b + \sin ax}}{a} + C.$$

$$42. \int \left(\frac{\sec x}{1 + \operatorname{tg} x} \right)^2 dx = -\frac{1}{1 + \operatorname{tg} x} + C.$$

$$(43.) \int \frac{dx}{2 + 3x} = \frac{\ln(2 + 3x)}{3} + C.$$

$$(44.) \int \frac{x^2 dx}{2 + x^3} = \frac{\ln(2 + x^3)}{3} + C.$$

$$45. \int \frac{t dt}{a + bt^2} = \frac{\ln(a + bt^2)}{2b} + C.$$