

Práctica Integrales #1

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Cálculo I

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$$1) \int 3x^4 dx = 3 \int x^4 dx = 3 \frac{x^5}{5} = \frac{3}{5} x^5 + C$$

$$2) \int 2x^7 dx = 2 \int x^7 dx = \frac{2x^8}{8} = \frac{1}{4} x^8 + C$$

$$2) \int \frac{3}{t^5} dt = 3 \int \frac{1}{t^5} dt = 3 \int t^{-5} dt = 3 \frac{t^{-4}}{-4} = -\frac{3}{4t^4} + C$$

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

$$3) \int 5u^{3/2} du = 5 \int u^{3/2} du = 5 \frac{u^{5/2}}{\frac{5}{2}} = 2u^{5/2} + C$$

$$6) \int 10 \sqrt[3]{x^2} dx = 10 \int x^{2/3} = 10 \frac{x^{5/3}}{\frac{5}{3}} = 6x^{5/3} + C$$

$$7) \int \frac{2}{\sqrt[3]{x}} dx = 2 \int \frac{1}{x^{1/3}} dx = 2 \int x^{-1/3} dx = \frac{2x^{2/3}}{\frac{2}{3}} = 3x^{2/3} + C$$

$$8) \int \frac{3}{\sqrt{y}} dy = 3 \int y^{-1/2} dy = \frac{3y^{1/2}}{\frac{1}{2}} = 6y^{1/2} + C$$

$$9) \int 6t^2 \sqrt[3]{t} dt = 6 \int t^2 t^{1/3} dt = 6 \int t^{7/3} dt = \frac{6t^{10/3}}{\frac{10}{3}} = \frac{18t^{10/3}}{10} + C$$

$$10) \int (3v^5 - 2v^3) dv = \int 3v^5 dv - \int 2v^3 = 3 \int v^5 dv - 2 \int v^3 dv = 3 \frac{v^6}{6} - \frac{2v^4}{4} = \frac{1}{2} v^6 - \frac{1}{2} v^4 + C$$

$$11) \int y^3(2y^2 - 3) dy = \int 2y^5 - 3y^3 dy = \int 2y^5 dy - \int 3y^3 dy = 2 \int y^5 dy - 3 \int y^3 dy = \frac{2y^6}{6} - \frac{3y^4}{4} + C$$

$$12) \int x^4(5 - x^2) dx = \int 5x^4 - x^6 dx = \int 5x^4 dx - \int x^6 dx = 5 \int x^4 dx - \int x^6 dx = \frac{5x^5}{5} - \frac{x^7}{7} = x^5 - \frac{x^7}{7} + C$$

$$13) \int (8x^4 + 4x^3 - 6x^2 - 4x + 5) dx = \int 8x^4 dx + \int 4x^3 dx + \int 6x^2 dx - \int 4x dx + \int 5 dx \\ = 8 \int x^4 dx + 4 \int x^3 dx - 6 \int x^2 dx - 4 \int x dx + 5 \int dx = \frac{8x^5}{5} + \frac{4x^4}{4} - \frac{6x^3}{3} - \frac{4x^2}{2} + 5x \\ = \frac{8x^5}{5} + x^4 - 2x^3 - 2x^2 + 5x + C$$

$$15) \int \sqrt{x}(x+1) dx = \int x^{1/2}(x+1) dx = \int x^{3/2} + x^{1/2} dx = \int x^{3/2} dx + \int x^{1/2} dx = \frac{x^{5/2}}{\frac{5}{2}} + \frac{x^{3/2}}{\frac{3}{2}} = \frac{2x^{5/2}}{5} + \frac{2x^{3/2}}{3} + C$$

$$17) \int (x^{\frac{2}{3}} + \frac{3}{x^2} + 5) dx = \int (2x^{-3} + 3x^{-2} + 5) dx = \int 2x^{-3} dx + \int 3x^{-2} dx + \int 5 dx = 2 \int x^{-3} dx + 3 \int x^{-2} dx + 5 \int dx \\ = \frac{2x^{-2}}{-2} + \frac{3x^{-1}}{-1} + 5x = -x^{-2} + 3x^{-1} + 5x + C = -\frac{1}{x^2} + \frac{3}{x} + 5x + C$$

$$19) \int \frac{x^2 + 4x - 4}{\sqrt{x}} dx = \int x^{-1/2} (x^2 + 4x - 4) dx = \int (x^{3/2} + 4x^{1/2} - 4x^{-1/2}) dx = \int x^{3/2} dx + \int 4x^{1/2} dx - \int 4x^{-1/2} dx$$

$$= \frac{x^{5/2}}{5/2} + \frac{4x^{3/2}}{3/2} - \frac{4x^{1/2}}{1/2} = \frac{2x^{5/2}}{5} + \frac{8x^{3/2}}{3} - \frac{8x^{1/2}}{1} + C$$

$$21) \int (\sqrt[3]{x} + \frac{1}{2\sqrt[3]{x}}) dx = \int (x^{1/3} + x^{-1/3}) dx = \int x^{1/3} dx + \int x^{-1/3} dx = \frac{x^{4/3}}{4/3} + \frac{x^{2/3}}{2/3} = \frac{3x^{4/3}}{4} + \frac{3x^{2/3}}{2} + C$$

$$23) \int (3 \sin t - 2 \cos t) dt = \int 3 \sin t dt - \int 2 \cos t dt = 3 \int \sin t dt - 2 \int \cos t dt = -3 \cos t - 2 \sin t + C$$

$$25) \int \frac{\sec x}{\cos^2 x} dx = \int \tan x \cdot \sec x dx = \sec x + C$$

$$27) \int (4 \csc x \cot x + 2 \sec^2 x) dx = \int 4 \csc x \cot x dx + \int 2 \sec^2 x dx = 4 \int \csc x \cot x dx + 2 \int \sec^2 x dx$$

$$= -4 \csc x + 2 \tan x + C$$

$$29) \int (2 \cot^2 \theta - 3 \tan^2 \theta) d\theta = \int 2 \cot^2 \theta d\theta - \int 3 \tan^2 \theta d\theta = 2 \int \cot^2 \theta d\theta - 3 \int \tan^2 \theta d\theta$$

$$= 2 \int (\csc^2 \theta - 1) d\theta - 3 \int (\sec^2 \theta - 1) d\theta = -2 \cot \theta - 3 \tan \theta - \theta + C$$