Saitechinfo NEET JEE Academy Worksheets

Find the antiderivative of the following functions:

1. $\int (4e^{3x} + 1)\,dx$
2. $\int x^2\left(1 - \frac{1}{x^2}\right)\,dx$
3. $\int (ax^2 + bx + c)\,dx$
4. $\int (2x^2 + e^x)\,dx$
5. $\int \left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)^2\,dx$
6. $\int \frac{x^3+5x^2-4}{x^2}\,dx$
7. $\int \frac{x^3+3x+4}{\sqrt{x}}\,dx$
8. $\int \frac{x^3-x^2+x-1}{x-1}\,dx$
9. $\int (1-x)\sqrt{x}\,dx$
10. $\int \sqrt{x}(3x^2 + 2x + 3)\,dx$
11. $\int (2x - 3\cos x + e^x)\,dx$
12. $\int (2x^2 - 3\sin x + 5\sqrt{x})\,dx$
13. $\int \sec x(\sec x + \tan x)\,dx$
14. $\int \frac{\sec^2 x}{\csc^2 x}\,dx$
15. $\int \frac{2-3\sin x}{\cos^2 x}\,dx$

Answer Key

1. $\int (4e^{3x} + 1)\,dx = \frac{4}{3}e^{3x} + x + C$
2. $\int x^2\left(1 - \frac{1}{x^2}\right)\,dx = \int (x^2 - 1)\,dx = \frac{x^3}{3} - x + C$
3. $\int (ax^2 + bx + c)\,dx = \frac{ax^3}{3} + \frac{bx^2}{2} + cx + C$
4. $\int (2x^2 + e^x)\,dx = \frac{2x^3}{3} + e^x + C$
5. $\int \left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)^2\,dx = \int (x - 2 + \frac{1}{x})\,dx = \frac{x^2}{2} - 2x + \ln|x| + C$
6. $\int \frac{x^3+5x^2-4}{x^2}\,dx = \int (x + 5 - \frac{4}{x^2})\,dx = \frac{x^2}{2} + 5x + \frac{4}{x} + C$
7. $\int \frac{x^3+3x+4}{\sqrt{x}}\,dx = \int (x^{5/2} + 3x^{1/2} + 4x^{-1/2})\,dx = \frac{2}{7}x^{7/2} + 6x^{3/2} + 8x^{1/2} + C$
8. $\int \frac{x^3-x^2+x-1}{x-1}\,dx = \int (x^2 + 1)\,dx = \frac{x^3}{3} + x + C$
9. $\int (1-x)\sqrt{x}\,dx = \int (x^{1/2} - x^{3/2})\,dx = \frac{2}{3}x^{3/2} - \frac{2}{5}x^{5/2} + C$
10. $\int \sqrt{x}(3x^2 + 2x + 3)\,dx = \int (3x^{5/2} + 2x^{3/2} + 3x^{1/2})\,dx = \frac{6}{7}x^{7/2} + \frac{4}{5}x^{5/2} + 2x^{3/2} + C$
11. $\int (2x - 3\cos x + e^x)\,dx = x^2 - 3\sin x + e^x + C$
12. $\int (2x^2 - 3\sin x + 5\sqrt{x})\,dx = \frac{2x^3}{3} + 3\cos x + \frac{10}{3}x^{3/2} + C$
13. $\int \sec x(\sec x + \tan x)\,dx = \int (\sec^2 x + \sec x\tan x)\,dx = \tan x + \sec x + C$
14. $\int \frac{\sec^2 x}{\csc^2 x}\,dx = \int \tan^2 x\,dx = \int (\sec^2 x - 1)\,dx = \tan x - x + C$
15. $\int \frac{2-3\sin x}{\cos^2 x}\,dx = \int (2\sec^2 x - 3\sec x\tan x)\,dx = 2\tan x - 3\sec x + C$