

Compute the following integrals

1. $\int \ln x dx$

2. $\int x^n \ln x dx, n \neq -1$

3. $\int \frac{\ln x}{x} dx$

4. $\int x^3 e^x dx$

5. $\int e^x \sin x dx$

6. $\int \tan x dx$

7. $\int \cot x dx$

8. $\int \frac{dx}{x^2-4x+8}$

9. $\int \cos^3 x dx$

10. $\int \sin^4 x dx$

11. $\int \frac{x^3}{\sqrt{1-x^2}} dx$

12. $\int \frac{x^3+1}{x^2+1} dx$

13. $\int \frac{2x^4-7x^3+11x^2-8x-1}{x^3-4x^2+5x-2} dx$

Solutions

1. $x \ln x - x$

2. $\frac{x^{n+1}}{n+1} \left(\ln x - \frac{1}{n+1} \right)$

3. $\frac{(\ln x)^2}{2}$

4. $e^x(x^3 - 3x^2 + 6x - 6)$

5. $\frac{e^x}{2}(\sin x - \cos x)$

6. $-\ln |\cos x|$

7. $\ln |\sin x|$

8. $\frac{1}{4} \arctan \left(\frac{x-2}{2} \right)$

9. $\sin x - \frac{1}{3} \sin^3 x$

10. $\frac{3x}{8} - \frac{\sin(2x)}{2} + \frac{\sin(4x)}{32}$

11. $-\sqrt{1-x^2} + \frac{1}{3}(1-x^2)^{3/2}$

12. $\arctan x - \frac{1}{2} \ln(x^2 + 1)$

13. $x^2 + x - \frac{3}{x-1} + \ln |(x-2)^3(x-1)^2|$