

Compute each of the following integrals.

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

8. $\int \frac{1}{x^2-6x+8} dx$

15. $\int \frac{4x^2-13x+13}{(x-1)(x-2)(x-3)} dx$

2. $\int \frac{1}{x(x-3)} dx$

9. $\int \frac{1}{x^2-6x+9} dx$

16. $\int \tanh^{-1} x dx$

3. $\int \coth x dx$

10. $\int \frac{1}{x^2-6x+10} dx$

17. $\int \frac{1}{x^4-1} dx$

4. $\int \frac{1}{x(x+2)} dx$

11. $\int \frac{x-1}{(x+3)(x+1)} dx$

18. $\int \frac{4x^3+7x^2+2x+7}{x^4-1} dx$

5. $\int \frac{1}{1-x^2} dx$

12. $\int \operatorname{sech} x dx$

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

6. $\int \sinh^{-1} x dx$

13. $\int \frac{x+5}{(x^2+1)(x-2)} dx$

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

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

14. $\int \frac{x^3}{(x^2+2)(x-1)} dx$

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

Answers

- 1.) $\sinh^{-1} x + C$ or $\ln(x + \sqrt{x^2 + 1}) + C$ 2.) $\frac{1}{3} \ln|x - 3| - \frac{1}{3} \ln|x| + C$ or $\frac{1}{3} \ln\left|\frac{x - 3}{x}\right|$
- 3.) $\ln|\sinh x| + C$ 4.) $\frac{1}{2} \ln|x| - \frac{1}{2} \ln|x + 2| + C$ 5.) $\frac{1}{2} \ln|x + 1| - \frac{1}{2} \ln|x - 1| + C$
- 6.) $x \operatorname{arcsinh} x - \sqrt{x^2 + 1} + C$ 7.) $\cosh^{-1} x + C$ or $\ln|x + \sqrt{x^2 - 1}| + C$ 8.) $\frac{1}{2} \ln|x - 4| - \frac{1}{2} \ln|x - 2| + C$
- 9.) $-\frac{1}{x - 3} + C$ 10.) $\tan^{-1}(x - 3) + C$ 11.) $2 \ln|x + 3| - \ln|x + 1| + C$ 12.) $2 \tan^{-1}(e^x) + C$
- 13.) $\frac{9}{5} \tan^{-1} x + \frac{7}{5} \ln|x - 2| - \frac{7}{10} \ln(x^2 + 1) + C$ 14.) $x + \frac{1}{3} \ln|x - 1| + \frac{1}{3} \ln(x^2 + 2) - \frac{2\sqrt{2}}{3} \tan^{-1}\left(\frac{\sqrt{2}}{2}x\right) + C$
- 15.) $2 \ln|x - 1| - 3 \ln|x - 2| + 5 \ln|x - 3| + C$
- 16.) $x \tanh^{-1} x + \frac{1}{2} \ln(1 - x^2) + C$ or $\frac{1}{2} x \ln(x + 1) - \frac{1}{2} x \ln(1 - x) + \frac{1}{2} \ln(1 - x^2) + C$
- 17.) $-\frac{1}{2} \tan^{-1} x + \frac{1}{4} \ln|x - 1| - \frac{1}{4} \ln|x + 1|$ 18.) $5 \ln|x - 1| - 2 \ln|x + 1| + \frac{1}{2} \ln(x^2 + 1) + C$
- 19.) $\ln|x - 1| + \frac{1}{x - 1} + C$ 20.) $2 \ln|x - 1| + C$ 21.) $\ln|x - 1| - \frac{3}{x - 1} + C$