

Methods of Integration – Solutions

1. $e^x - \tan x + c$

2. $\frac{x^3}{3} - 2x + 4 \ln|x| + c$

3. $-\cos x + c$

4. $\ln(1 + \sin x) + c$

5. $\frac{1}{2} \sin(2x^3 + x^2 + 4) + c$

6. $\frac{1}{4}(\ln x)^4 + c$

7. $e^{\tan x} + c$

8. $\frac{2}{5}(x+2)^{5/2} - \frac{4}{3}(x+2)^{3/2} + c$

9. $\frac{1}{2} \ln|x^2 + 2x - 5| + c$

10. $x \ln x - x + c$

11. $\frac{1}{3}(x^2 + 2x - 1) \sin 3x$
 $+ \frac{2}{9}(x+1) \cos 3x - \frac{2}{27} \sin 3x + c$

12. $\frac{1}{2}(x+3)e^{2x} - \frac{1}{4}e^{2x} + c$

13. $\frac{x^3}{3} \ln x - \frac{x^3}{9} + c$

14. $x \tan^{-1} x - \frac{1}{2} \ln(1 + x^2) + c$

15. $\frac{1}{2}(e^x \sin x - e^x \cos x) + c$

16. $\frac{1}{3} \sec^3 \theta + c$

17. $\frac{1}{2}\theta + \frac{1}{4} \sin 2\theta + c$

18. $-\frac{1}{3} \csc^3 \theta + c$

19. $\frac{1}{2} \sin^2 \theta + c$

20. $\frac{1}{8} \tan^4 2\theta + c$

21. $\frac{1}{7} \cos^7 \theta - \frac{1}{5} \cos^5 \theta + c$

22. $\ln|x + \sqrt{x^2 - 1}| + c$

23. $\tan^{-1}(x+1) + c$

24. $\tan^{-1}(e^x) + c$

25. $32 \left[\frac{1}{5} \left(\frac{\sqrt{x^2 + 4}}{2} \right)^5 - \frac{1}{3} \left(\frac{\sqrt{x^2 + 4}}{2} \right) \right] + c$

26. $\sin^{-1}(x-1) + c$

27. $2 \ln|x| + 4 \ln|x+2| - 5 \ln|x+1| + c$

28. $3 \ln|x| - \frac{3}{2} \ln|x^2 + 1| + \tan^{-1} x + c$

29. $-\frac{3}{4} \ln|x| + \frac{3}{4} \ln|x+2| - \frac{5}{2}(x+2)^{-1} + c$

30. $-\ln|x| + \frac{1}{2} \ln|x+1| + \frac{1}{2} \ln|x-1| + c$

31. $-\ln|e^x + 2| + \ln|e^x + 1| + c$

32. $-\ln|\cos x| + \tan^{-1}(\cos x) + c$

33. $\frac{2}{\sqrt{3}} \tan^{-1} \left(\frac{x^{1/2}}{3} \right) - \tan^{-1} \left(\frac{x^{1/2}}{2} \right) + c$