Math Formulas: Integrals of Trigonometric Functions

List of integrals involving trigonometric functions

1. $$\int \sin x \; dx = -\cos x$$
2. $$\int \cos x \; dx = \sin x$$
3. $$\int \sin^2 x \; dx = \frac{x}{2} - \frac{1}{4}\sin(2x)$$
4. $$\int \cos^2 x \; dx = \frac{x}{2} + \frac{1}{4}\sin(2x)$$
5. $$\int \sin^3 x \; dx = \frac{1}{3}\cos^3 x - \cos x$$
6. $$\int \cos^3 x \; dx = \sin x - \frac{1}{3}\sin^3 x$$
7. $$\int \frac{dx}{\sin x} = \ln\left|\tan\frac{x}{2}\right|$$
8. $$\int \frac{dx}{\cos x} = \ln\left|\tan\left(\frac{x}{2} + \frac{\pi}{4}\right)\right|$$
9. $$\int \frac{dx}{\sin^2 x} = -\cot x$$
10. $$\int \frac{dx}{\cos^2 x} = \tan x$$
11. $$\int \frac{dx}{\sin^3 x} = -\frac{\cos x}{2 \cdot \sin^2 x} + \frac{1}{2}\ln\left|\tan\frac{x}{2}\right|$$
12. $$\int \frac{dx}{\cos^3 x} = \frac{\sin x}{2 \cdot \cos^2 x} + \frac{1}{2}\ln\left|\tan\left(\frac{x}{2} + \frac{\pi}{2}\right)\right|$$
13. $$\int \sin x \cdot \cos x dx = -\frac{1}{4}\cos(2x)$$
14. $$\int \sin^2 x \cdot \cos x dx = \frac{1}{3}\sin^3 x$$
15. $$\int \sin x \cdot \cos^2 x dx = -\frac{1}{3}\cos^3 x$$
16. $$\int \sin^2 x \cdot \cos^2 x dx = \frac{x}{8} - \frac{1}{32}\sin(4x)$$
17. $$\int \tan x \; dx = -\ln|\cos x|$$
18. $$\int \frac{\sin x}{\cos^2 x} dx = \frac{1}{\cos x}$$
19. $$\int \frac{\sin^2 x}{\cos x} dx = \ln\left|\tan\left(\frac{x}{2} + \frac{\pi}{4}\right)\right| - \sin x$$
20. $$\int \tan^2 x \; dx = \tan x - x$$
21. $$\int \cot x \; dx = \ln|\sin x|$$

22. $$\int \frac{\cos x}{\sin^2 x} dx = -\frac{1}{\sin x}$$

23. $$\int \frac{\cos^2 x}{\sin x} dx = \ln \left| \tan \frac{x}{2} \right| + \cos x$$

24. $$\int \cot^2 x \; dx = -\cot x - x$$

25. $$\int \frac{dx}{\sin x \cdot \cos x} = \ln |\tan \; x|$$

26. $$\int \frac{dx}{\sin^2 x \cdot \cos x} = -\frac{1}{\sin x} + \ln \left| \tan \left(\frac{x}{2} + \frac{\pi}{4} \right) \right|$$

27. $$\int \frac{dx}{\sin x \cdot \cos^2 x} = \frac{1}{\cos x} + \ln \left| \tan \frac{x}{2} \right|$$

28. $$\int \frac{dx}{\sin^2 x \cdot \cos^2 x} = \tan x - \cot x$$

29. $$\int \sin(mx) \cdot \sin(nx) \; dx = -\frac{\sin(m+n)x}{2(m+n)} + \frac{\sin(m-n)x}{2(m-n)}, \quad m^2 \neq n^2$$

30. $$\int \sin(mx) \cdot \cos(nx) \; dx = -\frac{\cos(m+n)x}{2(m+n)} - \frac{\cos(m-n)x}{2(m-n)}, \quad m^2 \neq n^2$$

31. $$\int \cos(mx) \cdot \cos(nx) \; dx = \frac{\sin(m+n)x}{2(m+n)} + \frac{\sin(m-n)x}{2(m-n)}, \quad m^2 \neq n^2$$

32. $$\int \sin x \cdot \cos^n x \; dx = \frac{\sin^{n+1} x}{n+1}$$

33. $$\int \sin^n x \cdot \cos \; x \; dx = \frac{\sin^{n+1} x}{n+1}$$

34. $$\int \arcsin x \; dx = x \cdot \arcsin x + \sqrt{1-x^2}$$

35. $$\int \arccos x \; dx = x \cdot \arccos x - \sqrt{1-x^2}$$

36. $$\int \arctan x \; dx = x \cdot \arctan x - \frac{1}{2} \ln(1+x^2)$$

37. $$\int \operatorname{arccot} x \; dx = x \cdot \operatorname{arccot} x + \frac{1}{2} \ln(1+x^2)$$