

Summary of Differential Formulas and Corresponding Integrals

1. $du = \frac{du}{dx} dx$

2. $d(au) = a du$

3. $d(u + v) = du + dv$

4. $d(u^n) = nu^{n-1} du$

5. $d(\ln u) = \frac{du}{u}$

6. a) $d(e^u) = e^u du$

b) $d(a^u) = a^u \ln a du$

7. $d(\sin u) = \cos u du$

8. $d(\cos u) = -\sin u du$

9. $d(\tan u) = \sec^2 u du$

10. $d(\cot u) = -\csc^2 u du$

11. $d(\sec u) = \sec u \tan u du$

12. $d(\csc u) = -\csc u \cot u du$

13. $d(\sin^{-1} u) = \frac{du}{\sqrt{1-u^2}}$

14. $d(\cos^{-1} u) = \frac{-du}{\sqrt{1-u^2}}$

15. $d(\tan^{-1} u) = \frac{du}{1+u^2}$

16. $d(\cot^{-1} u) = \frac{-du}{1+u^2}$

17. $d(\sec^{-1} u) = \frac{du}{|u|\sqrt{u^2-1}}$

18. $d(\csc^{-1} u) = \frac{-du}{|u|\sqrt{u^2-1}}$

1. $\int du = u + C$

2. $\int a du = a \int du$

3. $\int (du + dv) = \int du + \int dv$

4. $\int u^n du = \frac{u^{n+1}}{n+1} + C, n \neq -1$

5. $\int \frac{du}{u} = \ln |u| + C$

6. a) $\int e^u du = e^u + C$

b) $\int a^u du = \frac{a^u}{\ln a} + C$

7. $\int \cos u du = \sin u + C$

8. $\int \sin u du = -\cos u + C$

9. $\int \sec^2 u du = \tan u + C$

10. $\int \csc^2 u du = -\cot u + C$

11. $\int \sec u \tan u du = \sec u + C$

12. $\int \csc u \cot u du = -\csc u + C$

13. and $\int \frac{du}{\sqrt{1-u^2}} = \begin{cases} \sin^{-1} u + C \\ -\cos^{-1} u + C' \end{cases}$

14. and $\int \frac{du}{1+u^2} = \begin{cases} \tan^{-1} u + C \\ -\cot^{-1} u + C' \end{cases}$

15. and $\int \frac{du}{u\sqrt{u^2-1}} = \begin{cases} \sec^{-1} |u| + C \\ -\csc^{-1} |u| + C' \end{cases}$

16. and $\int \frac{du}{u\sqrt{u^2-1}} = \begin{cases} \sec^{-1} |u| + C \\ -\csc^{-1} |u| + C' \end{cases}$