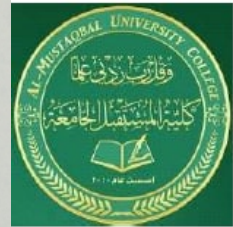


المبطلون السابقه
قسم الرياضيات والهندسة

المبطلون السابقه
د. م. م. د. م. م. د. م. م. د. م. م.

Integrals of trigonometric Functions

تكملة الدوال المثلثية



$$\textcircled{1} \int \sin u = -\cos u + C$$

$$\textcircled{2} \int \tan u \cdot du = -\ln |\cos u| + C$$

$$\textcircled{3} \int \sec u \cdot du = \ln |\sec u + \tan u| + C$$

$$\textcircled{4} \int \sec^2 u \cdot du = \tan u + C$$

$$\textcircled{5} \int \sec u \cdot \tan u \cdot du = \sec u + C$$

$$\textcircled{6} \int \csc u \cdot du = -\ln |\csc u + \cot u| + C$$

$$\textcircled{7} \int \cot u \cdot du = \ln |\sin u| + C$$

①



$$\textcircled{8} \int \csc u \cdot du = \ln |\csc u + \cot u| + C$$

$$\textcircled{9} \int \csc^2 u \cdot du = -\cot u + C$$

$$\textcircled{10} \int \csc u \cdot \cot u \cdot du = -\csc u + C$$

EX1) Evaluate the following integrals :-

$$\textcircled{1} \int \cos(3\theta - 1) d\theta$$

Ans

$$\frac{1}{3} \int 3 \cos(3\theta - 1) d\theta$$

$$= \frac{1}{3} \sin(3\theta - 1) + C$$

$$\textcircled{2} \int X \cdot \sin(2X^2) dX$$

Ans

$$\frac{1}{4} \int 4X \cdot \sin(2X^2) dX$$

$$= -\frac{1}{4} \cos(2X^2) + C$$

$\textcircled{2}$

$$\textcircled{3} \int \cos^2(2y) \cdot \sin(2y) dy$$

$$-\frac{1}{2} \int (\cos^2(2y) \cdot (-2\sin(2y))) dy$$

$$= -\frac{1}{2} \frac{\cos^3(2y)}{3} + C$$

$$= -\frac{1}{6} (\cos 2y)^3 + C$$

$$\textcircled{4} \int \sec^3 X \cdot \tan X \cdot dX$$

$$\int \sec^2 X (\tan X \cdot \sec X) \cdot dX$$

$$= \frac{\sec^3 X}{3} + C$$



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$$\textcircled{5} \int \sqrt{2+\sin 3t} \cdot \cos 3t \, dt$$

$$\frac{1}{3} \int (2+\sin 3t)^{\frac{1}{2}} \cdot 3 \cos 3t \, dt$$

$$= \frac{1}{3} \frac{(2+\sin 3t)^{\frac{3}{2}}}{\frac{3}{2}} + C$$

$$= \frac{1}{3} * \frac{2}{3} (2+\sin 3t)^{\frac{3}{2}} + C$$

$$= \frac{2}{9} \left(\sqrt{(2+\sin 3t)^3} \right) + C$$

$$\textcircled{6} \int \frac{d\theta}{\cos^2 \theta}$$

$$\int \sec^2 \theta \, d\theta$$

$$= \tan \theta + C$$



④

$$\textcircled{7} \int (1 - \sin^2 3t) \cdot \cos 3t \cdot dt$$



$$\int \cos 3t \, dt - \int \sin^2 3t \cdot \cos 3t \, dt$$

$$\frac{1}{3} \int 3 \cos 3t - \frac{1}{3} \int (\sin 3t)^2 \cdot 3 \cos 3t \, dt$$

$$= \frac{1}{3} \sin 3t - \frac{1}{3} \cdot \frac{\sin^3 3t}{3} + C$$

$$= \frac{1}{3} \sin 3t - \frac{1}{9} \sin^3 3t + C$$

~~فادا~~
في

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$$\textcircled{8} \int \tan^3(5x) \cdot \sec^2(5x) dx$$

$$\frac{1}{5} \int \tan^3(5x) \cdot (5 \sec^2(5x)) dx$$

$$\frac{1}{5} \frac{\tan^4(5x)}{4} + C$$

$$\frac{1}{20} \tan^4 5x + C$$

$$\textcircled{9} \int \cancel{\sin^4 x \cos^3 x} dx$$

$$\textcircled{9} \int \sec x (\tan x + \sec x) dx$$

$$\int (\sec x \tan x + \sec^2 x) dx$$

$$= \sec x + \tan x + C$$

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بوفيشناس 1/6/2021

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