وزارة التعليم العالي والبحث العلمي
المعهد التقني/ السماوة
قسم المساحة

اسم المادة : Mathematics and Spherical Triangles

اسم المدرسة : م .م لقاء طارق هادي

❖ Integration of trigonometric functions

Integration of trigonometric functions

- $\int \sin x \, dx = -\cos x + C$
- $\int \cos x \, dx = \sin x + C$
- $\int \sec^2 x \, dx = \tan x + C$
- $\int \operatorname{cosec}^2 x \, dx = -\cot x + C$
- $\int \sec x \tan x \, dx = \sec x + C$
- $\int \operatorname{cosec} x \cot x \, dx = -\operatorname{cosec} x + C$
- $\int \tan x \, dx = \ln | \sec x | + C$
- $\int \cot x \, dx = \ln | \sin x | + C$
- $\int \sec x \, dx = \ln | \sec x + \tan x | + C$
- $\int \operatorname{cosec} x \, dx = \ln | \operatorname{cosec} x - \cot x | + C$

Example: find the integral of the following function

$$\int \tan 5x \, dx = \frac{1}{5} \ln |\sec 5x| + C$$

Example: find the integral of the following function

$$\int 5 \sec 4x \tan 4x \, dx = \frac{5}{4} \sec 4x + C$$

Example: find the integral of the following function

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$$\int 4 \sin 3x \, dx = \frac{-4 \cos 3x}{3} + k$$

$$\int \frac{\cos 8x \, dx}{4} = \frac{\sin 8x}{32} + k$$

$$\int 3 \sec^2\left(\frac{x}{2}\right) dx = 6 \tan\left(\frac{x}{2}\right) + k$$

$$\int \cos\left(2x + \frac{\pi}{4}\right) dx = \frac{1}{2} \sin\left(2x + \frac{\pi}{4}\right) + k$$

Example: find the integral of the following functions

$$\int \tan \frac{1}{7} x \, dx = 7 \ln \sec \frac{1}{7} x + c$$

$$\int co\sec(3x+2)\, dx = \frac{1}{3} \ln\left[co\sec(3x+2) - \cot(3x+2)\right] + c$$

Example: find the integral of the following functions

$$\int \sec 5x \, dx = \frac{1}{5} \ln\left(Sec\, 5x + \tan 5x\right) + \mathrm{c}$$

Example: find the integral of the following functions

$$\int (\cos x + x)\, dx$$

$$\int (\cos x + x)\, dx = \int \cos x\, dx + \int x\, dx$$

$$= \sin x + x^2/2 + C$$

Example: find the integral of the following functions

$$\int \sec 5x\, dx = \frac{1}{5} \ln\left(Sec\, 5x + \tan 5x\right) + c$$