$$\int u\,dv = uv - \int v\,du$$

LIATE

- Logarithm
- Inverse
- Algebra
- Trigonometric
- Exponential

- نختار u الاولى ، dv الثانيه حسب ترتيب الكلمات ...

$$\int \sin^n x\,dx = -\frac{1}{n}\cos x \sin^{n-1} x + \frac{n-1}{n}\int \sin^{n-2} dx$$

$$\int \cos^n x\,dx = \frac{1}{n}\cos^{n-1}\sin x + \frac{n-1}{n}\int \cos^{n-2} dx$$

$$\int \sec^m x\,dx = \frac{\sec^{m-1}\tan x}{m-1} + \frac{m-2}{m-1}\int \sec^{m-2} dx$$

Important laws

$\sin^2 x + \cos^2 x = 1$	$\sin^2 x = \frac{1-\cos 2x}{2}$ الزاوية 2x ضعف الزاوية
$1 + \tan^2 x = \sec^2 x$	$\cos^2 x = \frac{1+\cos 2x}{2}$ ضعف

$1+\cot^2 x = \csc^2 x$	$\sin 2x = 2\sin x \cos x$
$\cos 2x = \cos^2 x - \sin^2 x$	

$\cos u \cos v = \frac{1}{2}[\cos(u+v) + \cos(u-v)]$	$\sin u \cos v = \frac{1}{2}[\sin(u+v) + \sin(u-v)]$
$\sin u \sin v = \frac{1}{2}[\cos(u-v) - \cos(u+v)]$	$\cos u \sin v = \frac{1}{2}[\sin(u+v) - \sin(u-v)]$

cos ← اذا الزوايا متشابهة

sin ← اذا الزوايا مختلفة

$$\int \sin^{m} x \cos^{n} x \, dx$$

m is odd

1. $\int \sin^{m-1} x \cos x \sin x \, dx$
2. $\sin^2 x = 1 - \cos^2 x$
3. $u = \cos x$

n is odd

1. $\int \sin^{m} x \cos^{n-1} x \cos x \, dx$
2. $\cos^2 x = 1 - \sin^2 x$
3. $u = \sin x$

mn both even

$\sin^2 x = \frac{1-\cos 2x}{2}$

$\cos^2 x = \frac{1+\cos 2x}{2}$

mn both odd

- نختار الأس الأصغر.

اذا كان m & $n = 1$

نكامل بالتعويض (العلبيي)

$$\int \tan^m x \sec^n x \, dx$$

m is odd

1. $\int \tan^{m-1} x \sec^{n-1} x \tan x \sec x \, dx$
2. $\tan^2 x = \sec^2 x - 1$
3. $u = \sec x$

n is even

1. $\int \tan^m x \sec^{n-2} x \sec^2 x \, dx$
2. $\sec^2 x = 1 + \tan^2 x$
3. $u = \tan x$

m n even odd

1. $\tan^2 x = \sec^2 x - 1$
2. $\int \sec^n x \, dx$ ← reduction formula

m n odd even

نختار الأس الأقل .

إذا كان $m = 1 \;||\; n = 2$

نكامل بالتعويض (العلبي)

by: Eng: Shahad Salaiman.