Gamma Function.

If m and n are non-negative integers, then $\int_0^{\pi/2} \sin^m x \cos^n x dx = \dfrac{\Gamma\left(\frac{m+1}{2}\right)\Gamma\left(\frac{n+1}{2}\right)}{2\Gamma\left(\frac{m+n+2}{2}\right)}$

Where $\Gamma(n)$ is called gamma function which satisfied the following properties

$\Gamma(n+1) = n\Gamma(n) = n!$ i.e. $\Gamma(1) = 1$ and $\Gamma(1/2) = \sqrt{\pi}$

In place of gamma function, we can also use the following formula :

$$\int_0^{\pi/2} \sin^m x \cos^n x dx = \frac{(m-1)(m-3).....(2 \text{ or } 1)(n-1)(n-3).....(2 \text{ or } 1)}{(m+n)(m+n-2)....(2 \text{ or } 1)}$$

It is important to note that we multiply by ($\pi/2$); when both m and n are even.