WALLIS'S FORMULA

If n is ODD $(n \geq 3)$

$$\int_0^{\frac{\pi}{2}} \cos^n x \, dx = \left(\frac{2}{3}\right)\left(\frac{4}{5}\right)\left(\frac{6}{7}\right)\cdots\left(\frac{n-1}{n}\right)$$

IF n IS EVEN $(n \geq 2)$

$$\int_0^{\frac{\pi}{2}} \cos^n x \, dx = \left(\frac{1}{2}\right)\left(\frac{3}{4}\right)\left(\frac{5}{6}\right)\cdots\left(\frac{n-1}{n}\right)\left(\frac{\pi}{2}\right)$$

6. $\int_0^{\frac{\pi}{2}} \cos^6 x \, dx \qquad n=6$

$$= \left(\frac{1}{2}\right)\left(\frac{3}{4}\right)\left(\frac{5}{6}\right)$$

$$= \frac{5}{16}$$

7. $\int \sec^2(9x+4) \, dx$

$u = 9x+4 \qquad du = 9 \, dx$

$$\frac{1}{9}\int 9\sec^2(9x+4) \, dx$$

$$\frac{1}{9}\int \sec^2 u \, du$$

$$= \frac{1}{9}\tan u + C$$

$$= \frac{1}{9}\tan(9x+4) + C$$