

$$1) \int \cos^2 x \, dx$$

D'après le formulaire,

$$\cos 2x = \cos^2 x - \sin^2 x$$

$$\sin^2 x + \cos^2 x = 1$$

$$\cos 2x = \cos^2 x - (1 - \cos^2 x)$$

$$\cos 2x = \cos^2 x + \cos^2 x - 1$$

$$\cos 2x = 2\cos^2 x - 1$$

$$2\cos^2 x = \cos 2x + 1$$

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

On peut donc écrire

$$\int \cos^2 x \, dx = \frac{1}{2} \int (\cos 2x + 1) \, dx$$

$$= \frac{1}{2} \int \cos 2x \cdot 2 \cdot \frac{1}{2} dx + \frac{1}{2} \int 1 dx$$

$$= \frac{1}{4} \int \cos 2x \cdot (2x)' dx + \frac{1}{2} x$$


$$= \frac{1}{4} \sin 2x + \frac{1}{2} x + C$$