

**Problem statement** Calculate four of the following integrals:

$$\int x \cos x^2 dx; \quad \int x^2 \cos x^2 dx; \quad \int x^2 \cos x dx; \quad \int x^2 \cos^2 x dx; \quad \int x \cos^2 x dx.$$

**Comment** Most people use *many* parentheses and rewrite the integrands to decrease possible confusion. So  $x^2 \cos^2 x$  becomes  $x^2(\cos x)^2$  and  $x^2 \cos x^2$  becomes  $x^2 \cos(x^2)$ .