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AM 183 Calculați integrala definită $\int_0^{\frac{\pi}{2}} \cos^5 x dx$

$$\int_0^{\frac{\pi}{2}} \cos^5 x dx = \int_0^{\frac{\pi}{2}} \cos^4 x \cdot \cos x dx = \int_0^{\frac{\pi}{2}} (1-\sin^2 x)^2 \cdot \cos x dx = \int_0^1 (1-t^2)^2 dt =$$

$$= \int_0^1 (1-2t^2+t^4)dt = (t - \frac{2t^3}{3} + \frac{t^5}{5})\Big|_0^1 = 1 - \frac{2}{3} + \frac{1}{5} = \frac{15-10+3}{15} = \frac{8}{15}$$

d

$\sin x = t$

$\cos x dx = dt$

$x = 0 \Rightarrow t = \sin 0 = 0$

$x = \frac{\pi}{2} \Rightarrow t = \sin \frac{\pi}{2} = 1$