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subst. de variáveis: $u = \operatorname{sen}(x)$ $du = \cos(x) dx$

$$a) \int \cot^3(x) \cos^2(x) dx = \int \frac{(1 - \operatorname{sen}^2(x))^2 \cdot \cos(x)}{\operatorname{sen}^3(x)} dx = \int \frac{(1 - u^2)^2}{u^3} du = \int \frac{1}{u^3} - \frac{2}{u} + u du = \int \frac{1}{u^3} du - \int \frac{2}{u} du + \int u du =$$

$$\int \frac{1}{u^3} du = -\frac{1}{2u^2}$$

$$-\frac{1}{2u^2} - 2 \ln|u| + \frac{u^2}{2} = -\frac{1}{2\operatorname{sen}^2(x)} - 2 \ln|\operatorname{sen}(x)| + \frac{\operatorname{sen}^2(x)}{2} = -\frac{\operatorname{cosec}^2(x)}{2} - 2 \ln|\operatorname{sen}(x)| + \frac{\operatorname{sen}^2(x)}{2}$$

$$\int \frac{2}{u} du = 2 \ln|u|$$

soma-se a constante

$$\int u du = \frac{u^2}{2}$$

$$\int \cot^3(x) \cos^2(x) dx = \frac{\operatorname{sen}^2(x)}{2} - \frac{\operatorname{cosec}^2(x)}{2} - 2 \ln|\operatorname{sen}(x)| + C$$

$$b) \int x^3 \sqrt{x^2+2} dx = \frac{1}{2} \int (u^2-2) u 2u du = \int (u^2-2) u^2 du = \int u^4 - 2u^2 du = \int u^4 du - \int 2u^2 du = \frac{u^5}{5} - \frac{2u^3}{3} = \frac{(\sqrt{x^2+2})^5}{5} - \frac{2(\sqrt{x^2+2})^3}{3} =$$

subst de variáveis:
 $\sqrt{x^2+2} = u \rightarrow \begin{cases} x^2 = u^2 - 2 \\ 2x dx = 2u du \end{cases}$

$$\frac{(x^2+2)^{\frac{5}{2}}}{5} - \frac{2(x^2+2)^{\frac{3}{2}}}{3} \xrightarrow{\text{soma-se a constante}} \int x^3 \sqrt{x^2+2} dx = \frac{(x^2+2)^{\frac{5}{2}}}{5} - \frac{2(x^2+2)^{\frac{3}{2}}}{3} + C$$