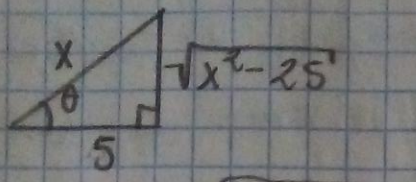
"Tarea 3.1" 01/08/21

Torres Oropeza Diego Alberto Grupo: 23.

a) $\int \frac{x}{\sqrt{x^2-25}}\,dx = \sqrt{x^2-25}+C$ //



$\cos\theta = \frac{5}{x} \rightarrow \boxed{x = \frac{5}{\cos\theta}}$ $\left\{\frac{d}{dx}\left(\frac{g}{f}\right) = -g \cdot \frac{\frac{d}{dx}(f)}{f^2}\right\}$

$dx = -5 \cdot \frac{\frac{d}{d\theta}(\cos\theta)}{\cos^2\theta}$

$dx = -5 \cdot \frac{-\sin\theta}{\cos^2\theta}$

$dx = -5 \cdot -\frac{\sin\theta}{\cos\theta} \cdot \frac{1}{\cos\theta}$

$\boxed{dx = 5\tan\theta\sec\theta\,d\theta}$

$\tan\theta = \frac{\sqrt{x^2-25}}{5} \rightarrow \boxed{\sqrt{x^2-25} = 5\tan\theta}$

$= \int \left(\left(\frac{5}{\cos\theta}\right)\frac{1}{5\tan\theta}\right)(5\tan\theta\sec\theta\,d\theta)$

$= \int \frac{5}{5\tan\theta\cos\theta}(5\tan\theta\sec\theta\,d\theta)$

$= \int \frac{25\tan\theta\sec\theta\,d\theta}{5\tan\theta\cos\theta} = \int \frac{5\sec\theta\,d\theta}{\cos\theta}$

$= \int 5\left(\frac{1}{\cos\theta}\right)\frac{d\theta}{\cos\theta} = \int \frac{5\,d\theta}{\cos^2\theta}$ $\left\{\int \sec^2 x\,dx = \tan x + C\right\}$

$= \int 5 \cdot \frac{1}{\cos\theta} \cdot \frac{1}{\cos\theta} \cdot d\theta = \int 5\sec^2\theta\,d\theta$

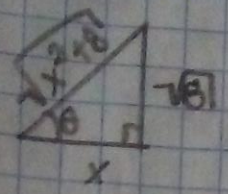
$= 5\tan\theta + C$ Sustituimos

$= 5\left(\frac{\sqrt{x^2-25}}{5}\right) + C = \sqrt{x^2-25} + C$ //

Resultado

$\int \frac{x}{\sqrt{x^2-25}}\,dx = \sqrt{x^2-25} + C$ //

b) $\int \frac{dx}{(\sqrt{x^2+8})^3} = \frac{x}{8\sqrt{x^2+8}} + C$ //



$\cos\theta = \frac{x}{\sqrt{x^2+8}}$

$\operatorname{sen}\theta = \frac{\sqrt{8}}{\sqrt{x^2+8}} \rightarrow \sqrt{x^2+8} = \frac{\sqrt{8}}{\operatorname{sen}\theta}$

$\tan\theta = \frac{\sqrt{8}}{x} \rightarrow x = \frac{\sqrt{8}}{\tan\theta}$

$\frac{d}{dx}\left(\frac{a}{f}\right) = -a \cdot \frac{\frac{d}{dx}(f)}{f^2}$

$dx = -\sqrt{8} \cdot \frac{\sec^2\theta}{\tan^2\theta} = -\sqrt{8} \cdot \frac{\left(\frac{1}{\cos\theta}\right)^2}{\left(\frac{\operatorname{sen}\theta}{\cos\theta}\right)^2}$

$dx = -\sqrt{8} \cdot \frac{1}{\operatorname{sen}^2\theta} = -\frac{\sqrt{8}}{\operatorname{sen}^2\theta}\, d\theta$

$= \int \frac{\left(-\frac{\sqrt{8}}{\operatorname{sen}^2\theta}\right)}{\left(\frac{\sqrt{8}}{\operatorname{sen}\theta}\right)^3} d\theta$

$= \int \frac{\left(-\frac{\sqrt{8}}{\operatorname{sen}^2\theta}\right)}{\frac{(\sqrt{8})^3}{\operatorname{sen}^3\theta}} d\theta = \int -\frac{2\sqrt{2}}{\frac{16\sqrt{2}}{\operatorname{sen}^3\theta}} d\theta = \int -\frac{2\sqrt{2}\operatorname{sen}^3\theta}{16\sqrt{2}\operatorname{sen}^2\theta} d\theta$

$= \int -\frac{\operatorname{sen}\theta}{8} d\theta = -\frac{1}{8}\int \operatorname{sen}\theta\, d\theta = -\frac{1}{8}(-\cos\theta) + C$

$= \frac{\cos\theta}{8} + C$ Sustituimos

$= \frac{\frac{x}{\sqrt{x^2+8}}}{8} + C = \frac{x}{8\sqrt{x^2+8}} + C$ //

Resultado

$\int \frac{dx}{(\sqrt{x^2+8})^3} = \frac{x}{8\sqrt{x^2+8}} + C$ //