Gerardo Arenas Nasrawin

6.5.

i) $\int_0^1 \frac{x}{x^4+3}\,dx = \frac{1}{3}\int_0^1 \frac{x}{\left(\frac{x^2}{\sqrt{3}}\right)^2+1}\,dx = \frac{1}{6}\int_0^1 \frac{2x}{\left(\frac{x^2}{\sqrt{3}}\right)^2+1}\,dx =$

$= \frac{\sqrt{3}}{6}\int_0^1 \frac{\frac{2x}{\sqrt{3}}}{\left(\frac{x^2}{\sqrt{3}}\right)^2+1}\,dx = \Big]_0^1 \frac{\sqrt{3}}{6}\operatorname{arctg}\left(\frac{x^2}{\sqrt{3}}\right)+C =$

$= \frac{\sqrt{3}}{6}\operatorname{arctg}\frac{1}{\sqrt{3}} - \cancel{\frac{\sqrt{3}}{6}\operatorname{arctg} 0}^{\,0} = \underline{\underline{\frac{1}{6}\pi}}.$

j) $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{1}{\operatorname{sen}^2(x)}$. Sabemos que si $f(x)=\operatorname{cotg}(x)$,

$f'(x) = -\frac{1}{\operatorname{sen}^2(x)}$, por lo que, $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{1}{\operatorname{sen}^2(x)} = \Big]_{\frac{\pi}{6}}^{\frac{\pi}{3}} -\operatorname{cotg}(x) =$

$= -\operatorname{cotg}\left(\frac{\pi}{3}\right) + \operatorname{cotg}\left(\frac{\pi}{6}\right) = \underline{\underline{\frac{2\sqrt{3}}{3}}}.$