

Quiz 12, September 27, 2016

Find $\int_0^\infty \frac{1}{x^2+1} dx$.

Answer: We see that

$$\begin{aligned} \int_0^\infty \frac{1}{x^2+1} dx &= \lim_{b \rightarrow \infty} \int_0^b \frac{1}{x^2+1} dx = \lim_{b \rightarrow \infty} (\arctan x|_0^b) \\ &= \lim_{b \rightarrow \infty} (\arctan(b) - \arctan(0)) = \pi/2 - 0 = \boxed{\pi/2}. \end{aligned}$$