Exercises

E15.2 [1BZ] Difficulty:*. Suppose that $f : \mathbb{R} \to \mathbb{R}$ is continuous and bounded, show that

$$\lim_{y \to 0+} \frac{y}{\pi} \int_{-\infty}^{\infty} \frac{f(x)}{x^2 + y^2} \, \mathbb{d}x = f(0)$$

(Hint. start with the case when f is constant.)