The Dirac delta function $\delta(x)$ satisfies

$$\begin{cases} \delta(x) = 0 \text{ if } x \neq 0, \\ \int_{-\infty}^{\infty} \delta(x)dx = 1. \end{cases}$$

And for any function $f(x)$, we have the equality

$$\int_{-\infty}^{\infty} \delta(x)f(x)dx = f(0).$$