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

1. $$\delta(x) = 0 \,\text{for all}\, x \neq 0$$

2. $$\int_{-\infty}^{\infty} \delta(x)dx = 1$$

From these properties, it follows that for all function f,

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