Maurycy Borkowski

24.03.2020

4/11 (10 punktów)

Lemat.

$$\int_0^b f(x) = \int_0^b f(b-x)$$

Podstawiając $u = b - x$ oraz $du = -dx$:

$$\int_0^b f(x) = \int_b^0 f(u)du = \int_b^0 f(b-x)(-dx) = \int_0^b f(b-x)dx$$

Dowód.

$$\int_0^\pi xf(\sin x)dx = \int_0^\pi (\pi - x)f(\sin(\pi - x))dx = \int_0^\pi \pi f(\sin x)dx - \int_0^\pi xf(\sin x)dx$$

$$\int_0^\pi xf(\sin x)dx = \frac{\pi}{2}\int_0^\pi f(\sin x)dx$$

□