

Evaluate the following integrals:

(1)

$$\int x e^{-x^2} dx$$

(2)

$$\int \frac{\cos(\sqrt{x} + 1)}{\sqrt{x}} dx$$

(3)

$$\int \frac{\arcsin x}{\sqrt{1-x^2}} dx$$

(4)

$$\int_0^3 \frac{x}{\sqrt{x^2+1}} dx$$

(5)

$$\int_e^{e^2} \frac{1}{x \ln x} dx$$