Normalization

Normalize the following functions over the given space

① $\psi(x) = 1 - x^2$ space $-1 \le x \le 1$

② $\psi(\theta) = e^{i\alpha\theta}$ space $0 \le \theta < 2\pi$

③ $\psi(x) = x e^{-\alpha x}$ space $0 \le x < \infty$ and $\alpha > 0$

Note: $\int_0^\infty x^n e^{-ax} dx = \frac{n!}{a^{n+1}}$ $a > 0$, n positive integer