Constraints on the Form of $\psi(x)$

$|\psi(x)|^2$ corresponds to a physically meaningful quantity:
the probability density of finding the particle near x.
To avoid unphysical behavior, $\psi(x)$ must satisfy some conditions:

$\psi(x)$ must be single-valued, and finite.

Finite to avoid infinite probability density.

$\psi(x)$ must be continuous, with finite $d\psi/dx$.

$d\psi/dx$ is related to the momentum.

In regions with finite potential, $d^2\psi/dx^2$ must be finite.

To avoid infinite energies.
This also means that $d\psi/dx$ must be continuous.

There is no significance to the overall *sign* of $\psi(x)$.

It goes away when we take the absolute square.

{In fact, we will see that $\psi(x,t)$ is usually complex!}