Physics 235: Quantum Mechanics

Homework 3.

1. Finite square barrier in an infinite square well.

\[
V(x) = \begin{cases} 
0 & \frac{a}{2} < |x| < \frac{L}{2} \\
V_0 & |x| \leq \frac{a}{2} \\
\infty & |x| \geq \frac{L}{2}
\end{cases}
\]

Consider both \( E < V_0 \) and \( E > V_0 \).

(a) Find equations which determine the energy eigenvalues.

(b) Find the energy eigenstate wave functions.

2. Scattering on a square potential barrier

\[
V(x) = \begin{cases} 
V_0 & 0 < x < a \\
0 & \text{otherwise.}
\end{cases}
\]

Considering \( E > V_0 \). Find the reflection coefficient and the transmission coefficient.