

## Chapter 2

Problem 2.29

$$\cot(z) = -\sqrt{\left(\frac{z_0}{z}\right)^2 - 1}.$$

Depending upon the well depth and width, there need not be an odd bound state.

Problem 2.34

(a)  $R = 1$ .

(b)

$$R = \frac{1}{V_0^2} \left( \sqrt{E} - \sqrt{E - V_0} \right)^4.$$

(c)  $T = 0$  for  $E < V_0$ .

(d)

$$T = \frac{4}{V_0^2} \sqrt{E} \sqrt{E - V_0} \left( \sqrt{E} - \sqrt{E - V_0} \right)^2.$$

Problem 2.35

(a)  $T = 1/9$ .

(c)  $T = 8/9$ .

Problem 2.39

(b)  $T = a\sqrt{2m/E}$ .

(c)  $E = \frac{1}{4}E_1$ .

Problem 2.42

$$E_n = \left(n + \frac{1}{2}\right)\hbar\omega, \quad n = 1, 3, 5, 7, \dots$$

Problem 2.46

$$\psi_n^\pm(x) = \frac{1}{\sqrt{L}} e^{\pm 2in\pi x/L}, \quad E_n = \frac{2n^2\pi^2\hbar^2}{mL^2}, \quad n = 0, 1, 2, \dots$$