Infinite Square Well

$$\psi_n(x) = \sqrt{\frac{2}{a}} \sin\left(\frac{n\pi}{a}x\right)$$
$$E_n = \frac{\pi^2 n^2 \hbar^2}{2ma^2}$$

1 Triangle

$$c_n = \frac{4\sqrt{6}}{(n\pi)^2}(-1)^{\frac{n-1}{2}} \quad \text{n odd}$$

$$\sum c_n^2 = \frac{96}{\pi^4}\sum \frac{1}{n^4}$$

how to evaluate this integral by exploiting symmetry?

$$\sum c_n^2 E_n = \frac{48\hbar^2}{ma^2\pi^2}\sum \frac{1}{n^2} \quad \text{n odd}$$
$$= \frac{6\hbar^2}{ma^2}$$

how to evaluate $\langle H \rangle$ in the presence of a corner discontinuity?

2 Flat

$$c_n = \frac{2\sqrt{2}}{n\pi} \quad \text{n odd}$$

$$\sum c_n^2 = \frac{8}{\pi^2}\sum \frac{1}{n^2}$$

$$\sum c_n^2 E_n = \frac{4\hbar^2}{2ma^2}\sum 1$$

3 Half-Flat

$$c_n = \frac{4}{\pi n}$$

$$\sum c_n^2 =$$

$$\sum c_n^2 E_n =$$

4 Quadratic

$$\psi(x,0) = \sqrt{\frac{30}{a^5}}x(a-x)$$

$$c_n = \frac{8\sqrt{15}}{(n\pi)^3} \quad \text{n odd}$$

$$\sum c_n^2 = \frac{960}{\pi^6}\sum\frac{1}{n^6} \quad \text{n odd}$$

$\langle H \rangle = \frac{5\hbar^2}{ma^2}$