

Question 1

A particle in an infinite well is in the state

$$\psi(x) = \sqrt{\frac{2}{L}} \sin\left(\frac{\pi x}{L}\right).$$

Which of the following is true?

1. $\psi(x)\hat{p}\psi(x)$ is symmetric and $\langle p \rangle = 0$.
2. $\psi(x)\hat{p}\psi(x)$ is anti-symmetric and $\langle p \rangle = 0$.
3. $\psi(x)\hat{p}\psi(x)$ is symmetric and $\langle p \rangle \neq 0$.
4. $\psi(x)\hat{p}\psi(x)$ is anti-symmetric and $\langle p \rangle \neq 0$.