

Question 1

The general expression for a standing wave with n antinodes is

$$y_n(x, t) = [A_n \sin(k_n x)] \cos(\omega_n t + \phi_n).$$

Suppose that at $t = 0$ the entire string is at rest. Which of the following is true?

1. $\phi_n = 0$
2. $\phi_n = \frac{\pi}{2}$
3. $\phi_n = \frac{3\pi}{2}$
4. $\omega_n = 0$
5. $\omega_n = \frac{\pi}{2}$