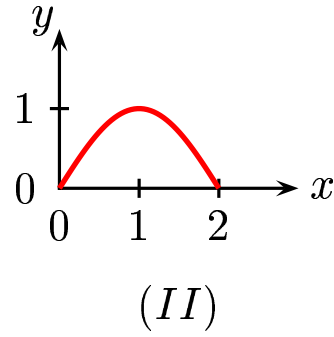
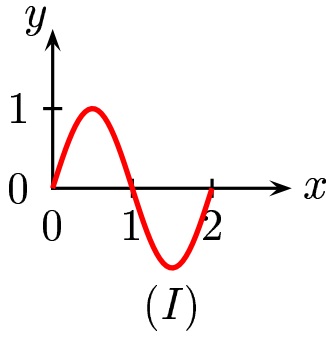


Consider a traveling wave: $y = \sin(\pi x + 3t)$. Define two graphs:



The correct shape and traveling velocity at time $t = 0$ is

- A) graph *I*, velocity $\approx +1 \hat{i}$.
- B) graph *I*, velocity $\approx -1 \hat{i}$.
- C) graph *II*, velocity $\approx +1 \hat{i}$.
- D) graph *II*, velocity $\approx -1 \hat{i}$.

At $t = 0$, $y = \sin(\pi x)$. (I) is the correct shape. The traveling velocity is obtained by taking the time derivative on the phase angle and setting it

to a constant; i.e., $\pi x + 3t = c$, and $\frac{d}{dt}(\pi x + 3t) = 0$, or the velocity is

$$-\frac{dx}{dt} = -\frac{3}{\pi} \simeq -1 \hat{i}.$$

Answer **B**.

16.03-01 Travelling Wave Shape and Direction 2007-4-17