

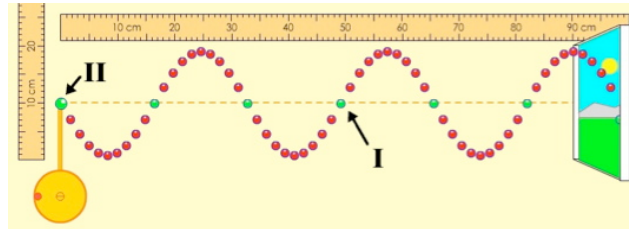
Name \_\_\_\_\_

Physics 132  
Spring 2017

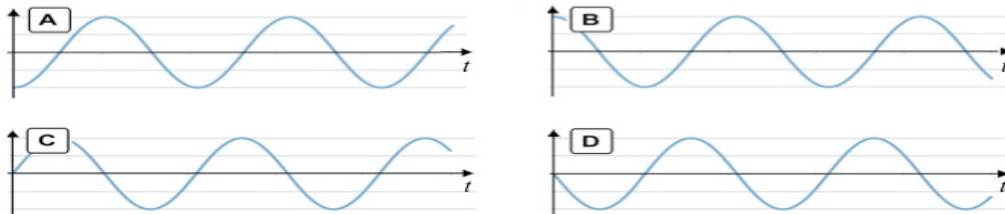
Prof. Redish  
10.April.17

Quiz #9  
(10 points)

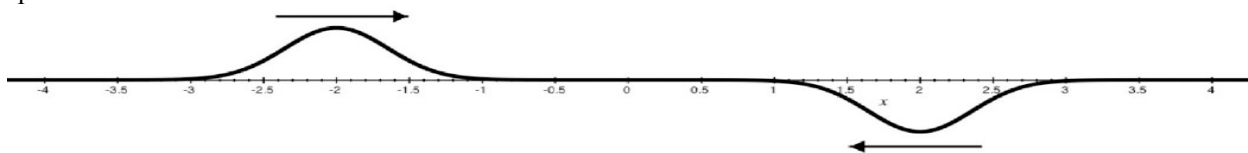
1. (4 points) A sinusoidal wave is created on a stretched elastic string by a driving wheel. It has been running for a while and has generated a traveling wave of amplitude 10 cm moving along the string to the right. (The string continues on for a long way to the right as indicated by its going “out the window.”) The figure shows an instant of time, which we take to be  $t = 0$ , when the beads marked I and II are both passing through their equilibrium point.



- 1.1 In the graphs below, if the vertical axis represents velocity, which could represent the vertical velocity of bead I as a function of  $t$ ? Put N if none work. (The axes cross as the  $v$ - $t$  origin.) (2 pts)
- 1.2 In the graphs below, if the vertical axis represents position, which could represent the vertical position of bead I as a function of  $t$ ? Put N if none work. (The axes cross as the  $y$ - $t$  origin.) (2 pts)



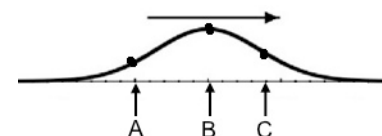
2. (3 points) The figure below represents a photo of a stretched elastic string with two pulses moving towards each other in opposite directions. The markings along the horizontal axis are in centimeters. The pulses have peaks that are displaced 0.5 cm from their equilibrium positions and the pulses move along the string with a speed of 200 cm/s.



If this photo was taken at a time 0 and the shape of each pulse is a Gaussian,  $f(x) = Ae^{-x^2/b^2}$ , if  $d = 2.0$  cm, which of the following equations might correctly represent the shape of the string at later times?

- A.  $f(x - v_0t) + f(x + v_0t)$       B.  $f(x - v_0t) - f(x + v_0t)$
- C.  $f(x + d - v_0t) + f(x - d + v_0t)$       D.  $f(x + d - v_0t) - f(x - d + v_0t)$
- E.  $f(x - d - v_0t) + f(x + d + v_0t)$       F.  $f(x - d - v_0t) - f(x + d + v_0t)$
- G. Something else (write it)

3. (3 points) A pulse is moving along a beaded elastic string to the right as shown. Three of the string's beads are shown and marked by the letters A, B, and C. If up is positive, what are the signs of the vertical velocities of each of the beads at the instant shown? (Put either P for positive, N for negative, or 0 for zero).



A. \_\_\_\_\_      B. \_\_\_\_\_      C. \_\_\_\_\_