

9. Using  $v = f\lambda$ , we find the length of one cycle of the wave is  $\lambda = 350/500 = 0.700 \text{ m} = 700 \text{ mm}$ . From  $f = 1/T$ , we find the time for one cycle of oscillation is  $T = 1/500 = 2.00 \times 10^{-3} \text{ s} = 2.00 \text{ ms}$ .
- (a) A cycle is equivalent to  $2\pi$  radians, so that  $\pi/3$  rad corresponds to one-sixth of a cycle. The corresponding length, therefore, is  $\lambda/6 = 700/6 = 117 \text{ mm}$ .
- (b) The interval  $1.00 \text{ ms}$  is half of  $T$  and thus corresponds to half of one cycle, or half of  $2\pi$  rad. Thus, the phase difference is  $(1/2)2\pi = \pi$  rad.