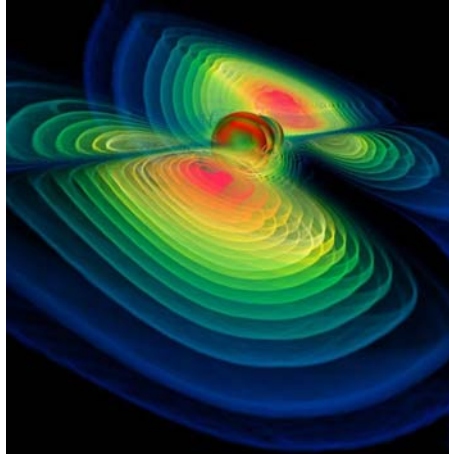


## PHY132S – Waves – Class 2

Gravity  
Waves



1

## About the Practicals 1

- Begin on Wednesday January 14
  - Since they are closely coupled to the classes, the “cycle” is Wednesday through Tuesday
- For the 1<sup>st</sup> Practical:
  - Come to MP125
  - Your name should appear on a posted list telling you which Practical room you should go to

2

## About the Practicals 2

- As Dr. Harlow said in an Announcement, with an email copy to all students, for the 1<sup>st</sup> Practical:
  - Go to the Labs section of the PHY132 web site  
(<http://www.physics.utoronto.ca/~jharlow/phy132labs09.html>)
  - Print out and bring the **Week 1 Student Guide**

3

## Announcement

- I have set up a *Waves* section in the Discussion Board of the PHY132 web site
- Another channel of communication between you and other participants in the course
- There are already two “threads”
- I will be reading and replying to questions posted there. You are encouraged to “jump in” to any discussion.

### Reminders

- Problem Set #1 is due this Friday by 11:59 PM
- Pre-Class Quiz #1 is due this Monday by 10 AM

4

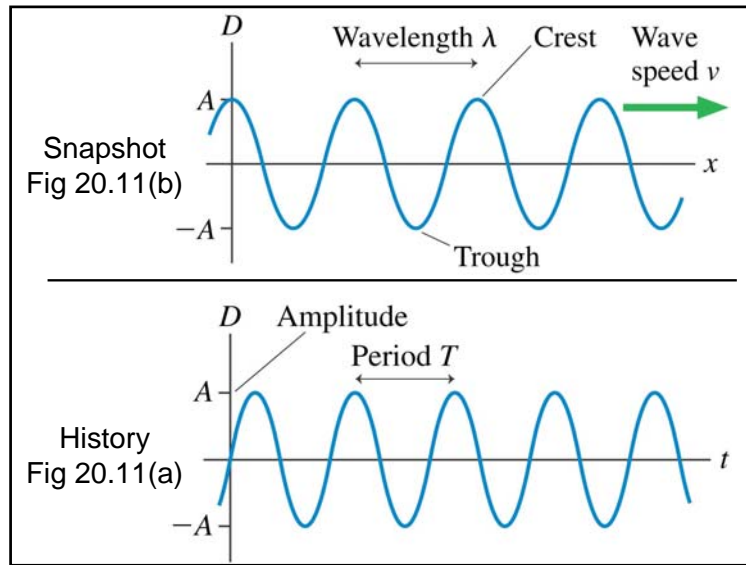
## Last Time

- Mechanical Waves: waves that require a medium
- The wave travels through the medium. The wave speed is relative to that medium
- Many waves: “transverse” or “longitudinal”
- Snapshot:  $D(x, \text{fixed } t)$   
History:  $D(\text{fixed } x, t)$
- Sinusoidal waves
  - Source: Simple Harmonic Motion
  - History: Wavelength  $\lambda$
  - Snapshot: Period  $T$        $f = \frac{1}{T}$        $\omega = 2\pi f$  <sub>5</sub>

## Today

- Continue Chapter 20 – Traveling Waves
  - §20.3 – Sinusoidal Waves continued
  - §20.4 – Waves in 2 and 3 Dimensions
  - §20.5 – Sound & Light
  - §20.6 – Power, Intensity & ~~Decibels~~
  - §20.7 – The Doppler Effect ?

6

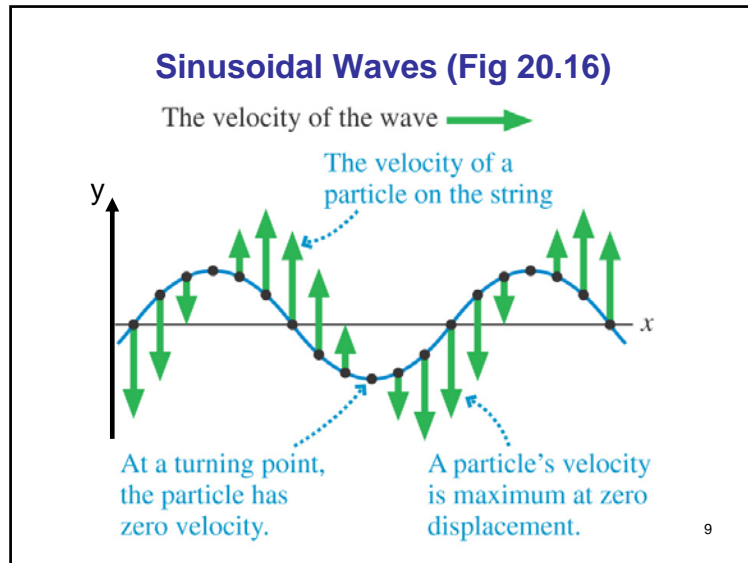


$$D(\text{fixed } x, t) = A \sin\left(2\pi \frac{t}{T} + \phi_0\right)$$

$$D(\text{fixed } x, t) = A \sin(\omega t + \phi_0)$$

$$\omega = 2\pi f = \frac{2\pi}{T}$$

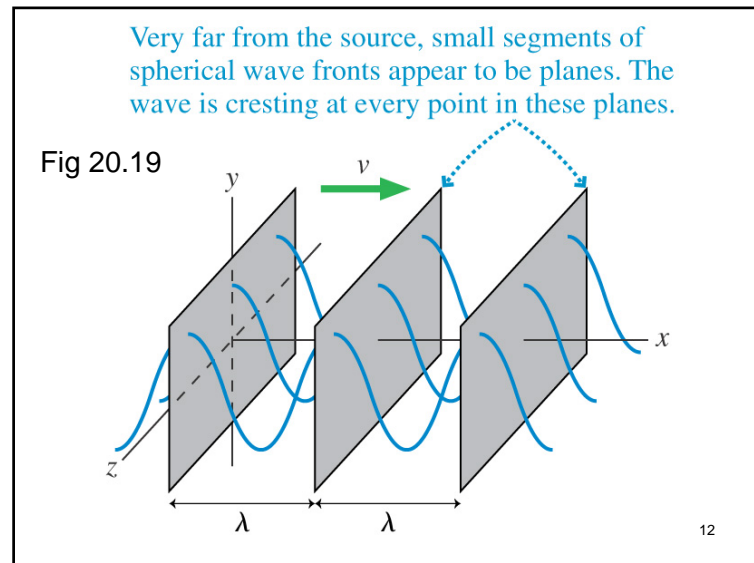
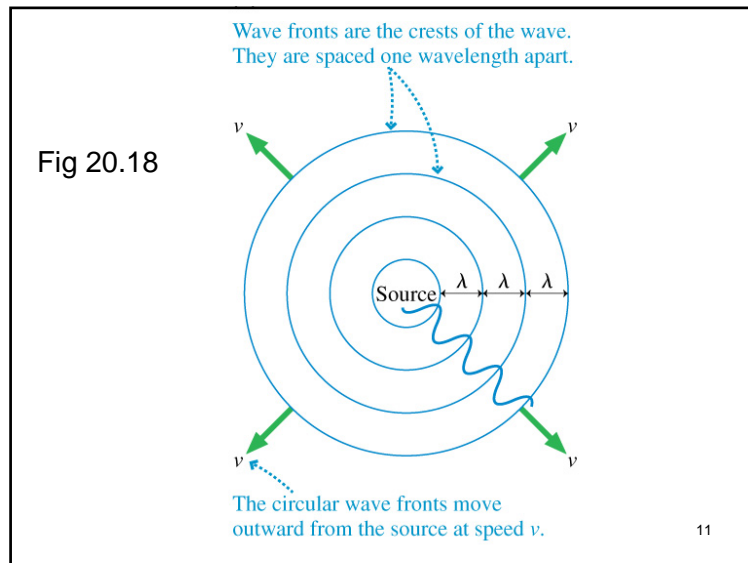
8



A weight is hung over a pulley and attached to a string composed of two parts, each made of the same material but one having two times the diameter of the other. The string is plucked so that a pulse moves along it, moving at speed  $v_1$  in the thick part and at speed  $v_2$  in the thin part. What is  $v_2/v_1$ ?

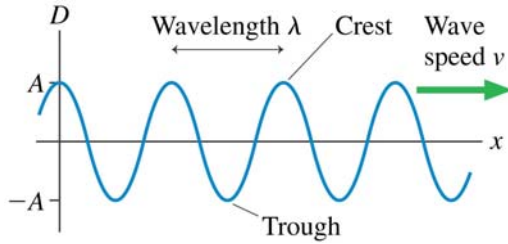
A 1  
 B. 2  
 C. 1/2  
 D. 1/4

10



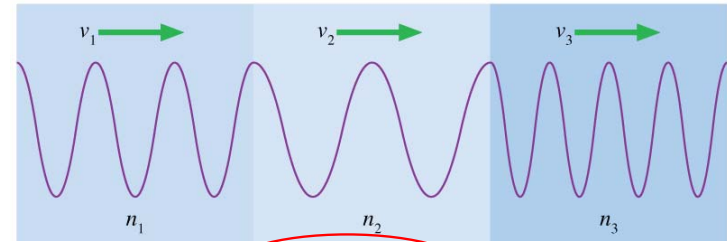
What is the magnitude of the phase difference between the maximum of a wave and the adjacent minimum? (crest to trough)

- A. 0
- B.  $\pi/4$
- C.  $\pi/2$
- D.  $3\pi/2$
- E.  $\pi$**



13

A light wave travels through three transparent materials of equal thickness. Rank in order, from the largest to smallest, the indices of refraction  $n_1$ ,  $n_2$ , and  $n_3$ .



- A.  $n_2 > n_1 > n_3$
- B.  $n_3 > n_1 > n_2$**
- C.  $n_1 > n_2 > n_3$
- D.  $n_3 > n_2 > n_1$
- E.  $n_1 = n_2 = n_3$