Reminders 3-27-08:
-Chapter 20 homework due Tonight
-Exam 3 April 1
-Read 21.8-21.13
-Lens Lab Has Been Changed

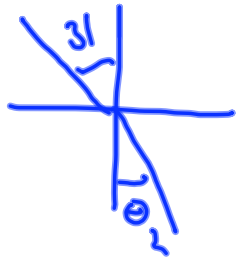
Objectives:
-Properties of Electromagnetic Waves
-Electromagnetic Spectrum
-Nature of Light
-Doppler Effect for Light

- A beam of light travels from air into water (n=1.33). The angle of incidence is 31°. Find the angle of refraction.

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$n_2 = 1.33 \quad n_1 = 1$

$\theta_1 = 31°$



$\sin\theta_2 = \frac{n_1}{n_2}\sin\theta_1$

$\theta_2 = \sin^{-1}\left(\frac{n_1}{n_2}\sin\theta_1\right)$

$= \sin^{-1}\left(\frac{1}{1.33}\sin 31\right)$

$= 23°$

A beam of light travels from water into air (n=1.33). The angle of incidence is 31°. Find the angle of refraction. What happens if the angle of incidence is 48.7°? 49°?

$n_1 \sin\theta_1 = n_2 \sin\theta_2$

$\theta_1 = 31°$ $n_1 = 1.33$ $n_2 = 1$

$\sin\theta_2 = \frac{n_1}{n_2}\sin\theta_1$

$\theta_2 = 43°$

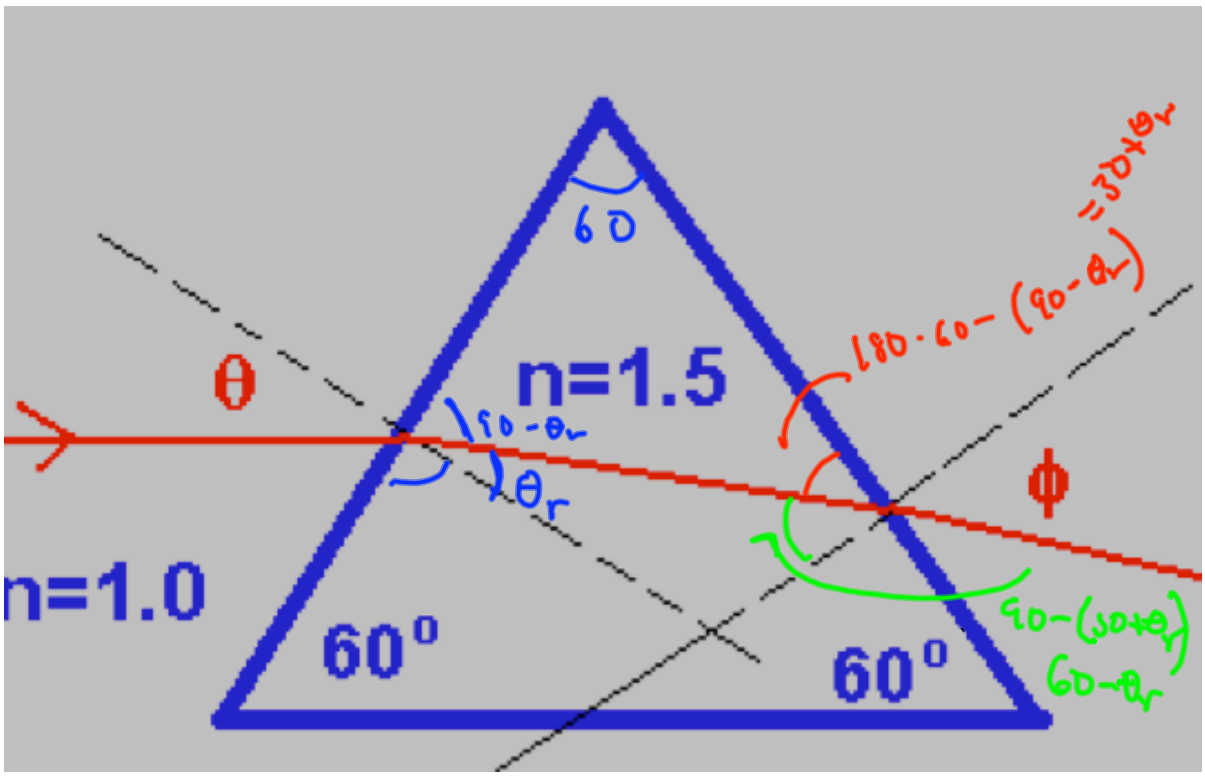
If $\theta_1 = 48.7°$

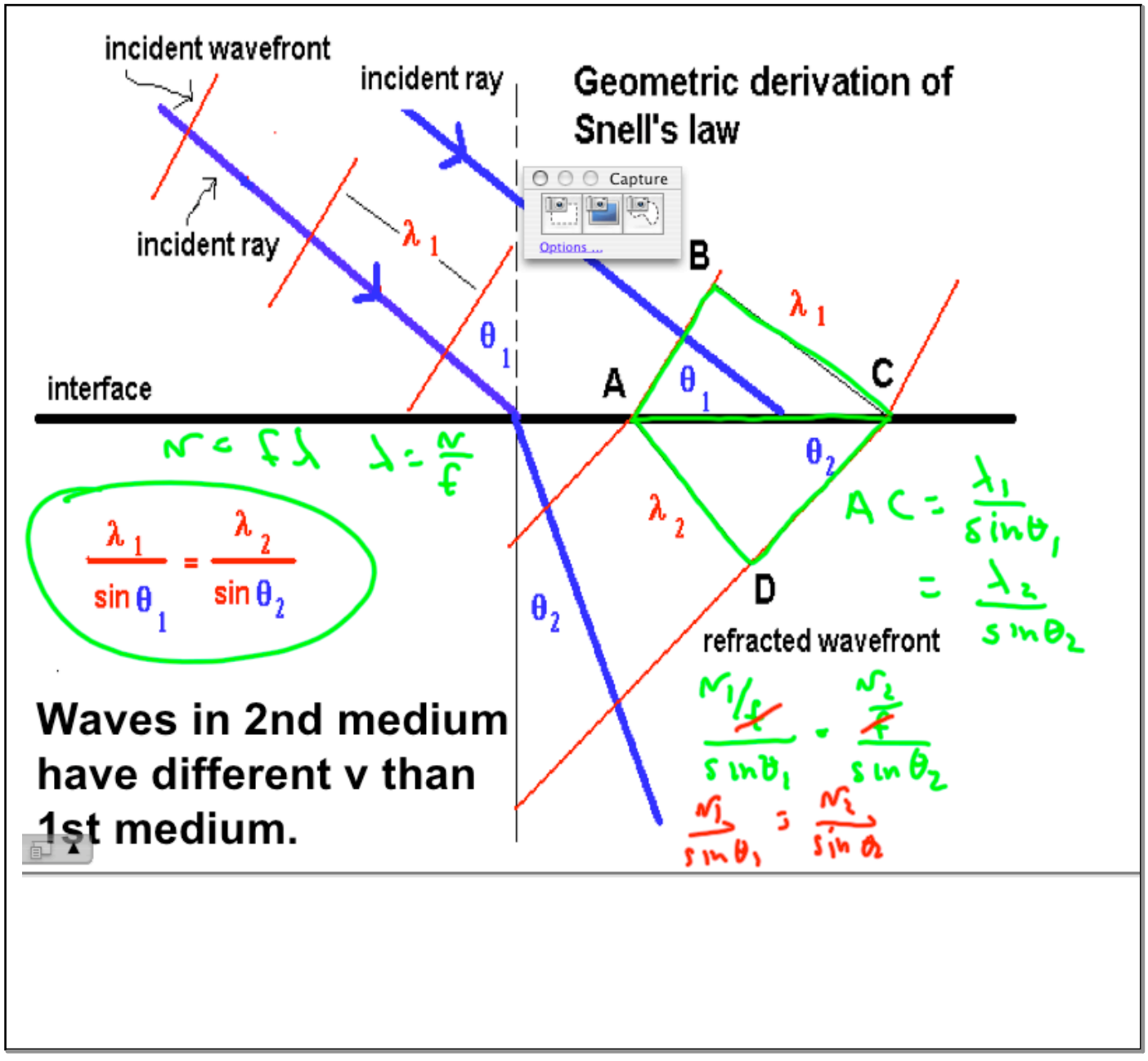
$\theta_2 = 89.9°$

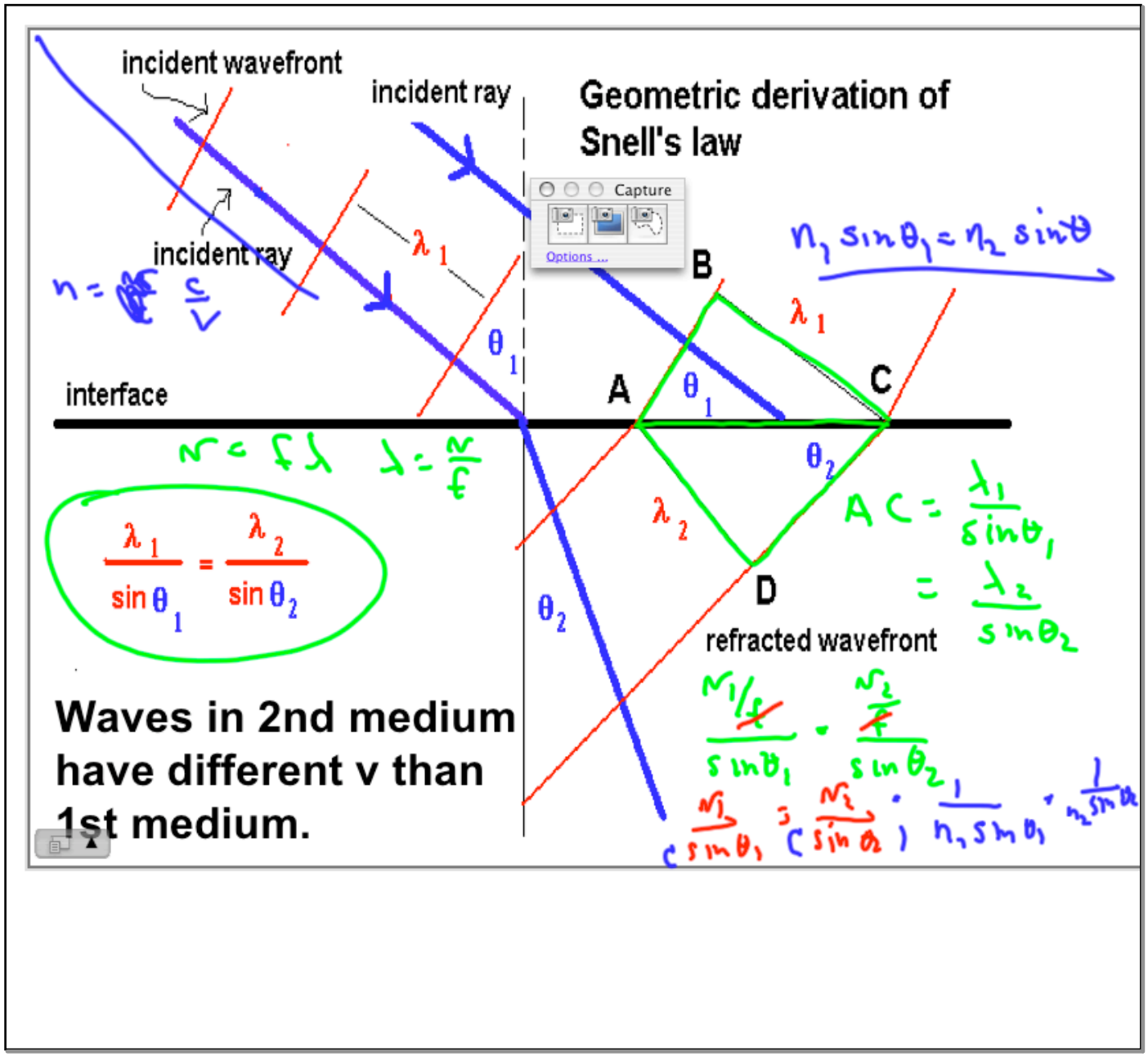
If $\theta_1 = 49°$

$\sin\theta_2 = \frac{1.33}{1}\sin 49 > 1$

Internally reflected


θ
n=1.5
n=1.0
60°
60°
60
ϕ


incident wavefront
incident ray
Geometric derivation of Snell's law
incident ray
Capture
Options ...
λ 1
θ 1
B
λ 1
C
interface
A
θ 1
θ 2
λ 2
AC = λ1 / sinθ1 = λ2 / sinθ2
D
θ 2
refracted wavefront
λ1 / sin θ1 = λ2 / sin θ2
Waves in 2nd medium have different v than 1st medium.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