

### Snell's Law

Read from Lesson 2 of the Refraction and Lenses chapter at The Physics Classroom:

- <http://www.physicsclassroom.com/Class/refrn/u14l2b.html>
- <http://www.physicsclassroom.com/Class/refrn/u14l2c.html>
- <http://www.physicsclassroom.com/Class/refrn/u14l2d.html>

**MOP Connection:** Refraction and Lenses: sublevel 4

**Math Review:**

To find an angle measure for which the sine value is 0.8660, enter



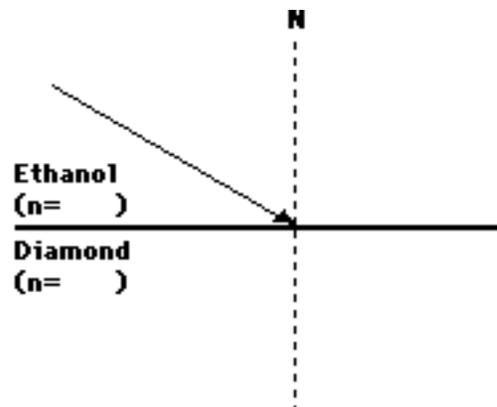
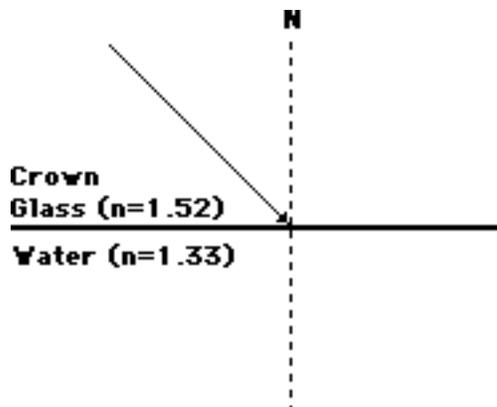
into your TI graphing calculator and press the Enter key. The angle is 59.99... degrees.

1. Use Snell's law to solve the following physics word problems. **PSYW**
  - a. An incident ray in air ( $n=1.0$ ) is approaching the boundary with an unknown material at an angle of incidence of  $61.6^\circ$ . The angle of refraction is  $41.4^\circ$ . Determine the index of refraction of the unknown material.

- b. An incident ray in air ( $n=1.0$ ) is approaching the boundary with glass ( $n = 1.52$ ) at an angle of incidence of  $32.5^\circ$ . Calculate the angle of refraction. Draw the refracted ray on the diagram at the right.

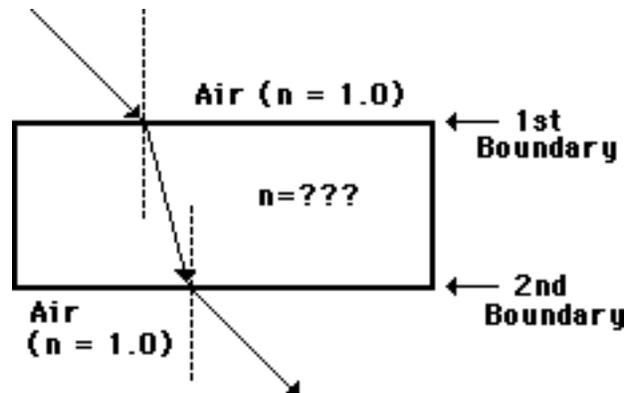


2. For the following two situations, measure and record  $\theta_i$ , calculate  $\theta_r$ , and draw in the refracted ray with the calculated angle of refraction. **PSYW**

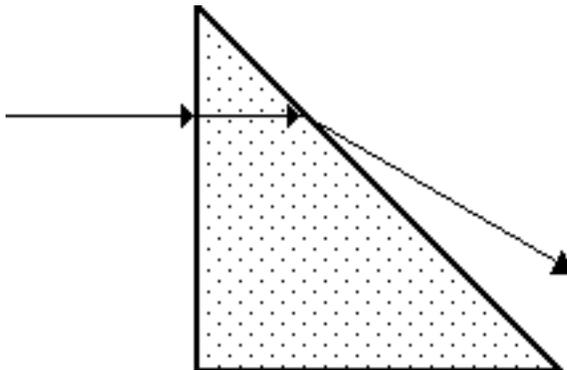


## Light, Refraction and Lenses

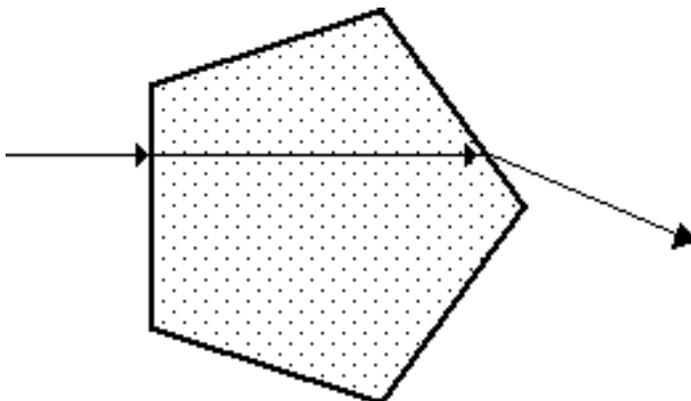
3. The diagram at the right shows a light ray entering a rectangular block of unknown material and subsequently exiting the block on the opposite side. The path of the light ray through the block is shown. Determine the index of refraction of the unknown material. Perform two calculations - one for each boundary - using Snell's law and the measured angles. **PSYW**



4. Cal Culator is performing experiments to determine the index of refraction of two unknown materials. Cal determines that the light follows the paths as shown on the diagrams below. Use this path, a protractor, a calculator and Snell's Law to determine the index of refraction of the unknown material. Show all your work in the space beside the diagram.



**Show your work below:**



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