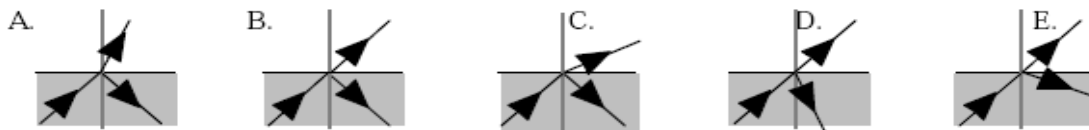


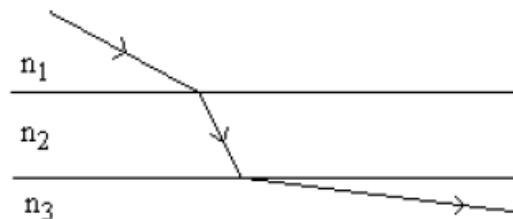
## AP 2 Light: Refraction/reflection worksheet 2

1. Which diagram best represents what happens to a ray of light entering air from water? Air is at the top in all diagrams.



2. The critical angle in a transparent substance surrounded by air is  $30^\circ$ . What is the speed of light in the substance?

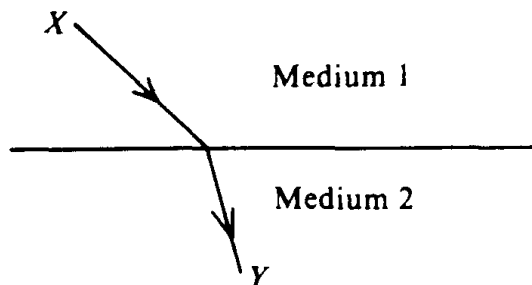
3. A beam of light passes from medium 1 to medium 2 to medium 3 as shown in the diagram. Rank the speed of light in each medium from largest to smallest.



4. A jeweler can distinguish between a diamond and a piece of glass by observing the critical angle of light in each material. Glass with an index of refraction of 1.52 has a critical angle of  $41.1^\circ$  while a diamond with an index of refraction of 2.42 would have what critical angle?

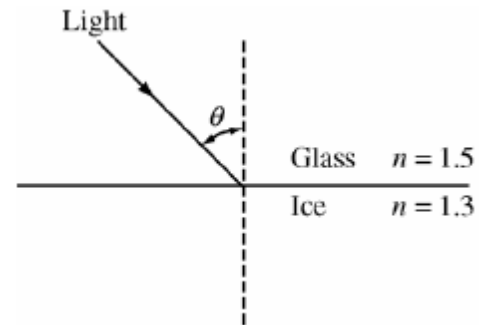
5. Light leaves a source at X and travels to Y along the path shown above. Which of the following statements is correct?

- (A) The index of refraction is the same for the two media.
- (B) Light travels faster in medium 2 than in medium 1.
- (C) Snell's law breaks down at the interface.
- (D) Light would arrive at Y in less time by taking a straight line path from X to Y than it does taking the path shown above.
- (E) Light leaving a source at Y and traveling to X would follow the same path shown above, but in reverse.



6. Light travels from material X with an index of refraction of  $n=1.5$  to material Y with an index of refraction of  $n=2.0$ . If the speed of light in material Y is  $v$ , what is the speed of light in material X?

7. A ray of light in glass that is incident on an interface with ice, as shown, is partially reflected and partially refracted. The index of refraction  $n$  for each of the two media is given in the figure. How do the angle of reflection and the angle of refraction compare with the angle of incidence  $\theta$ ? If the incident angle was  $25^\circ$ , what is the refracted angle? What is the reflected angle?



8. A ray of light in air is incident on a  $30^\circ$ - $60^\circ$ - $90^\circ$  prism, perpendicular to face  $ab$ , as shown in the diagram. The ray enters the prism and strikes face  $ac$  at the critical angle. What is the index of refraction of the prism?

