Week 28 - Light

Read Pages 320-321 – Reflection

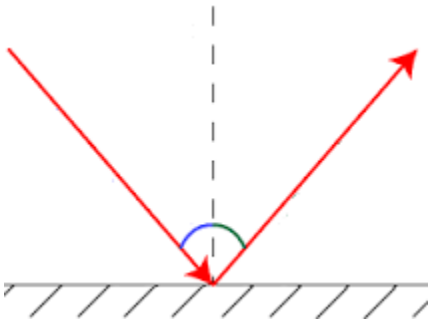
TQ1. What is the law of reflection?

TQ2. What does incidence or incident mean?

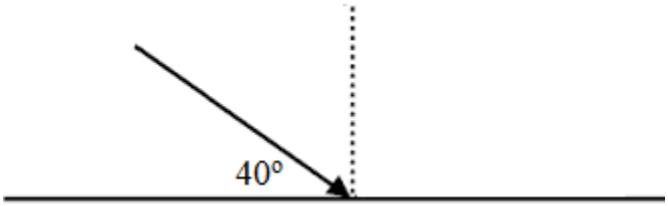
TQ3. What does reflection or reflected mean?

TQ4. What does "normal" mean (and it's definitely not your life!)?

CQ5. On the diagram below, label the incident ray, reflected ray, the normal line, θi, and θr.



CQ6. On the diagram below, what is the angle of incidence, θi? Also, draw a reflected ray on the diagram and label the angle of reflection, θr.



CQ7. Sketch a diagram below showing both the incident and reflected rays if a reflected ray is known to reflect at 60˚ to the normal.

Read Pages 327-332 – Refraction

TQ8. What is refraction?

TQ9. When a wave enters a new material (or new medium), what happens to its speed? To its frequency? To its wavelength?

TQ10. What is the index of refraction? What is the symbol for the index of refraction?

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TQ11. What is the equation for the index of refraction?

QQ12. A light ray traveling in air enters a second medium and its speed slows to 1.807 x 10^8 m/s. What is the absolute index of refraction (n) of the second medium? Look on page 328, what is the medium the light is in?

QQ13. A medium is found to have an index of refraction, n, of 1.50. What is the speed of the light inside this medium (keep in mind that the speed cannot exceed 3.00 x 10^8 m/s)?

Note: Since frequency does not change from one medium to another, the equation for index of refraction, n, can also be the following in addition to TQ11:

$$n = \frac{\lambda \text{ in air}}{\lambda \text{ in medium}}$$

QQ14. A beam of light has a wavelength of 450 x 10^{-7} in air. As it passes into another medium, the wavelength decreases to 2.96 x 10^{-5} m. What is the index of refraction on this medium? And using the chart on page 328, what is the medium this light is in?

TQ15. What is the equation for Snell's Law?

QQ16. A ray of light is traveling in air (n = 1.00) at an angle of 30.00°. As it enters another medium the angle decreases to 15.09°. What is the index of refraction of this new medium and what medium is it?

QQ17. A ray of light is traveling in air (n = 1.00) at an angle of 40.00°. As it enters water (n = 1.33), what will be the new angle inside this medium?

QQ18. A ray of light (n = 1.00) enters in at 39.3° and hits glass (n = 1.50). Calculate the angle of reflection and angle of refraction and sketch both angles on the diagram below.