

Name _____ Date _____
 Teacher _____ Period _____

Mirror & Lenses Review

Things you should know:

$n_i \sin \theta_i = n_r \sin \theta_r$	$n_s = \frac{c}{v_s}$	$\sin \theta_c = \frac{n_r}{n_i}$	$\frac{1}{f} = \frac{1}{d_i} + \frac{1}{d_o}$	$m = \frac{-d_i}{d_o} = \frac{h_i}{h_o}$
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Concepts

1. What are the two laws of reflection?
2. What is the difference between specular and diffuse reflection?
3. What is the index of refraction? What does it tell us about the speed of light in the substance?
4. How are the index of refraction and the optical density of on medium related?
5. What characteristics of a light wave changes with as enters a medium with a different index of refraction? What characteristic remains constant?
6. What is total internal reflection? List some applications of it.
7. In terms of index of refraction and optical density, when does the a ray of light entering a new medium bend towards the normal? Away from the normal?
8. How many light rays are required to find the image formed by a mirror or lens?
9. Be familiar with the trends and special cases for images formed for curved mirrors and lenses as shown through the diagrams in class.
10. Know the characteristics of the images formed for all types of mirrors (plane, concave, and convex) based on the location of the object.
11. Know the guidelines for drawing each type of ray for mirror and lens diagrams.
12. Know the relationship between the shape of a mirror or lens (concave or convex) and what it does to the light that hits it (converge or diverge)

Problems

13. Find the speed of light in water if it has an index of refraction of 1.33.

$$n = \frac{c}{v} \quad 1.33 = \frac{3 \times 10^8}{v} \quad v = \frac{3 \times 10^8}{1.33} = 2.26 \times 10^8 \text{ m/s}$$

14. A beam of light passes from air($n=1.00$) to water($n=1.33$). If the angle in the air is 24° , what is θ_r in the water?

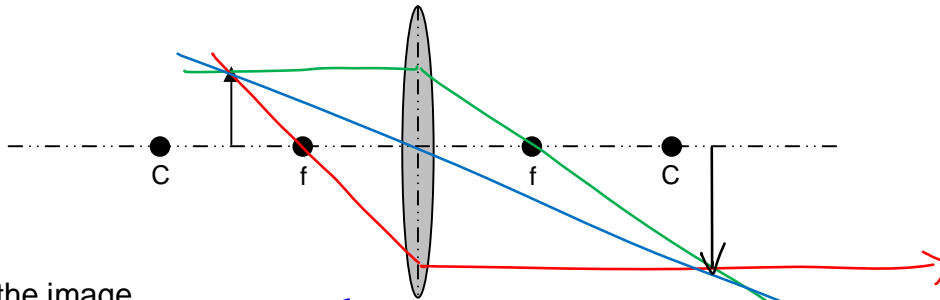
$$n_i \sin \theta_i = n_r \sin \theta_r$$

$$1 \sin 24^\circ = 1.33 \sin \theta_r$$

$$\sin \theta_r = \frac{1 \sin 24^\circ}{1.33}$$

$$\theta_r = \sin^{-1}(.306) = 17.8^\circ$$

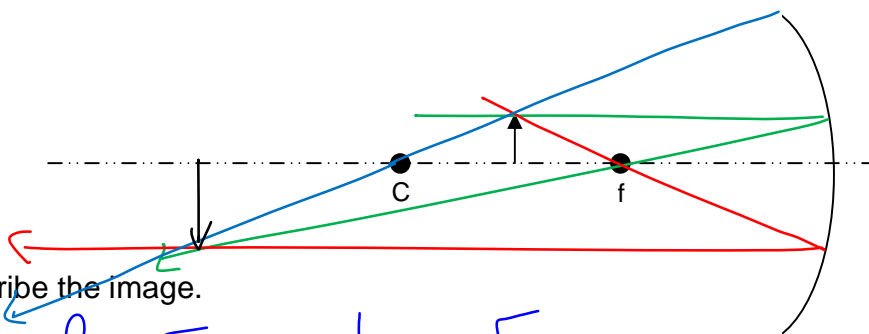
15. Draw a ray diagram to show where the image would be located.



Describe the image.

REAL, INVERTED, LARGER, FARTHER

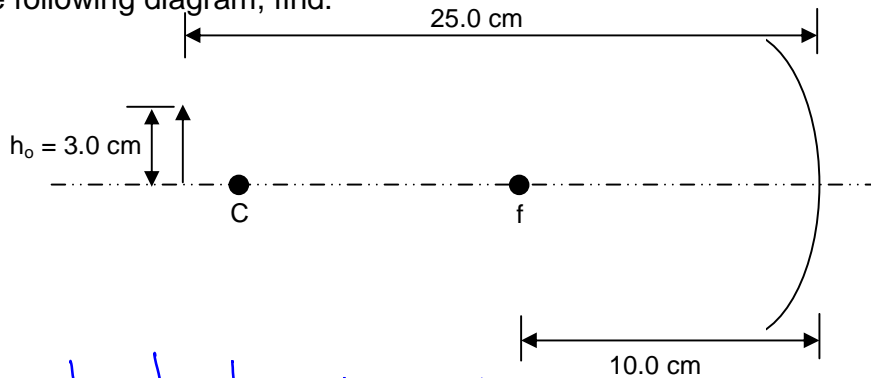
16. Draw a ray diagram to show where the image would be located.



Describe the image.

REAL, INVERTED, LARGER, FARTHER

17. For the following diagram, find:



- a. d_i $\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$ $\frac{1}{10} = \frac{1}{25} + \frac{1}{d_i}$ $\frac{5}{50} = \frac{2}{50} + \frac{1}{d_i}$ $d_i = \frac{50}{3}$ Answer $\frac{50}{3}$ cm
- b. h_i $h_i = M h_o = \left(-\frac{2}{3}\right)(3)$ Answer -2 cm
- c. magnification $M = -\frac{d_i}{d_o} = -\frac{50/3}{25}$ Answer $-\frac{2}{3}$