

Instructions:

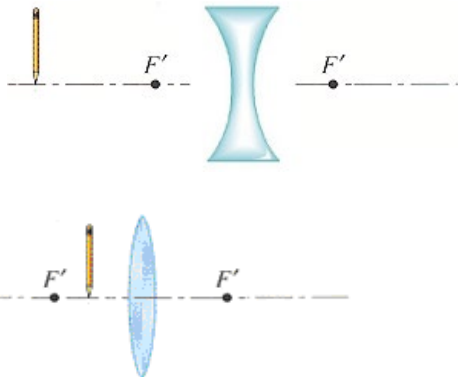
1. Do all of your work on this sheet.
2. **Show all of your steps** in problems for full credit.
3. **Be clear and neat** in your work. Any illegible work, or scribbling in the margins, will not be graded.
4. Place your **answers in a box**.
5. If you need more space, you may use the back of the page and write **On back** in the problem space.

1. **Multiple Guess (3 pts)** Find the answer which best fits the question and write it in the space provided.

- a. Which of the following is bent the most as it passes through a diffraction grating?
 a) red. b) green. c) blue. d) yellow. _____
- b. The separation of light into its component colors is called
 a) refraction; b) dispersion; c) polarization; d) reflection. _____
- c. Nearsighted vision can be corrected by using
 a) a converging lens; b) a diverging lens;
 c) more intense light; d) none of these _____

2. **Definition/Principle (7 pts)**

a. Sketch the ray diagrams clearly showing the images and indicate if the final images *are real/virtual*.



b. Label the location of the red bands on the primary and secondary rainbow.



3. **Problems (10 pts)**

- a. A farsighted person has a near point of 75.0 cm. What focal length lens is needed to correct this?
- b. The photograph of a monkey four feet high is to be taken by a camera lens which has a 9 inch focal length. The monkey stands 9 feet in front of the camera lens. How large is the image, {Use inches; do not convert to metric!}
- c. With two slits spaced 0.20 mm apart and a screen at a distance of $L = 1.00$ m, the third bright fringe is found to be displaced 7.50 mm from the central fringe. Find the wavelength of the light.

d. Two sources of light are in phase and emit waves that have a wavelength of 0.44 m. Determine whether constructive or destructive interference occurs at a point whose distances from the sources are

- i. 1.32 m and 3.08 m;
- ii. 2.67 m and 3.33 m.

Bonus: Locate the final image. Is it real or virtual? _____

