PHY 102 Quiz #5 **Name** _____

Score _____

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.

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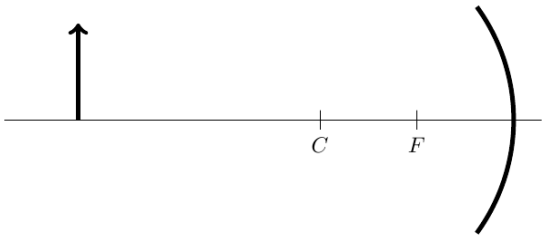
1. **Multiple Guess (3 pts)** Find the answer which best fits the question and write it in the space provided.

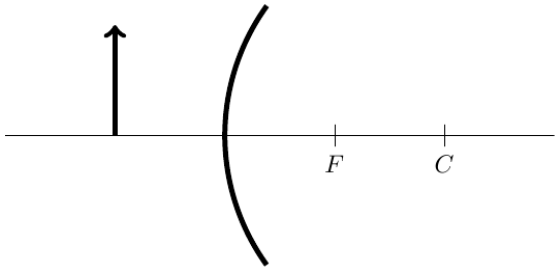
a Which of the following is bent the least as it passes through a prism?
a) red b) green c) blue d) violet. _____

b. For a convex mirror the image appears
a) real, inverted, smaller; b) virtual, inverted, larger;
c) real, upright, larger; d) virtual, upright, smaller;
e) none of these. _____

c. What electromagnetic wave in the list has the smallest wavelength ?
a) red light; b) violet light; c) microwaves; d) radio waves; _____

2. **Definition/Principle (5 pts)** Sketch the ray diagrams for the following mirrors. Clearly show the images and indicate if they are *real/virtual*.





Bonus: A child looks into the back of her shiny soupspoon, which has a 4.0 cm diameter. She sees her image reduced by a factor of one-eighth. How far is the child's face from the spoon?

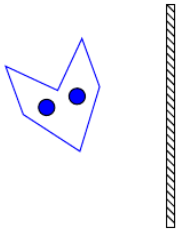
3. **Problems (12 pts)**

a. A truck driver broadcasts at a frequency of 30,000 Hz. What is the wavelength of this electromagnetic wave?

b. The index of refraction for red light in crown glass is $n = 1.52$. What is the angle of refraction for light incident 30° to the surface from the air?

c. An insect is trapped and preserved in amber ($n = 1.546$). It appears to be 2.5 cm beneath the surface. How far below the surface is it actually?

d. Clearly draw the image in the mirror to scale and location.



e. The critical angle for a special glass in air is 44 degrees. What is the critical angle if the glass is immersed in water?

f. The focal length of a concave mirror is 8 cm. A 3.0 cm object is placed 32 cm in front of the mirror. Find the image location and height.