Physics 200 (Stapleton) Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Optics Practice Quiz

****

1. Substance A (n = 1.3) is separated from substance B (n = 2.5) by a flat plane. A ray of light travels from substance A to substance B, meeting the planar boundary between the substances at a 22° angle of incidence.

1. Sketch a simple diagram showing the ray refracting as it travels from substance A to substance B.
2. On your sketch, label the normal, the angle of incidence, and the angle of refraction. Calculate the angle of refraction and add that number to your diagram.
3. On another part of your diagram (or in a new diagram) show a ray of light with an angle of incidence equal to its critical angle. Calculate and label the critical angle, $θ\_{c}$. Draw what happens to the ray when it hits the boundary between the two substances.

2. A thin convex lens has a focal length of 5cm. An object 1cm tall is placed on the lens’ principal axis, at a distance of 2cm from the center of the lens.

1. Is the object’s image real or virtual?
2. Is the image upright or inverted?
3. What is the distance of the image from the lens?
4. What is the height of the image?
5. What is the magnification (M) of the object in this situation?
6. Optional -- Sketch or draw a ray diagram to confirm your answers.

3. The same object (1cm tall) is placed on the principal axis of a convex lens with f = 3cm, at a distance of 9 cm from the center of the lens.

1. Is the object’s image real or virtual?
2. Is the image upright or inverted?
3. What is the distance of the image from the lens?
4. What is the height of the image?
5. What is the magnification (M) of the object in this situation?
6. Optional – Sketch or draw a ray diagram to confirm your answers.