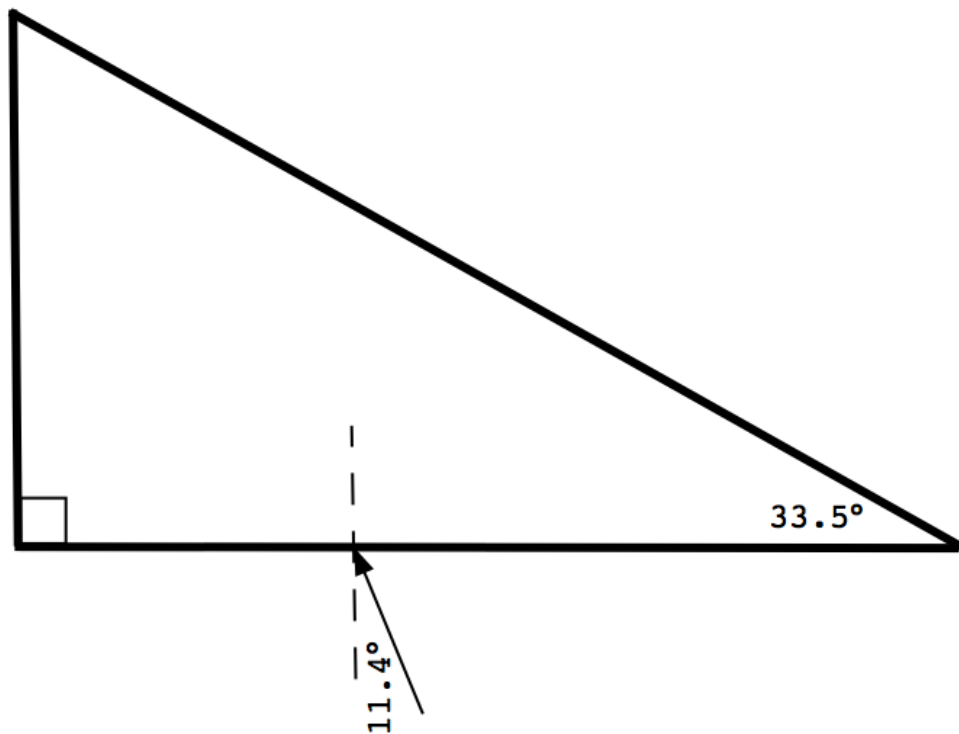


## **Physics 10164 - Exam 3D**

Partial credit will be given provided you show all work and are solving parts of the problem correctly. Points will be deducted if you don't show your work even if you get the right answer. Clearly indicate your answer with a circle or a box and remember to include correct units and significant figures.

1. (25 pts) A person stands 1.7 meters away from a mirror and sees an inverted image of himself that is 40% of his actual height. If he wants to see an upright image of himself in the same mirror that is 50% larger than this actual height, how close must he stand to the mirror?

2. (25 pts) Light is incident on the bottom edge of a triangular prism as shown below. The prism is surrounded by air and made from a substance with  $n = 1.44$ . Through what face does the light exit the prism and with what exit angle of refraction?



3. (25 pts) A converging lens of focal length 15 cm is placed 35 cm in front of a diverging lens of focal length -27 cm.

- a) If an object is placed 5.0 cm in front of the converging lens, what is the final image location and magnification of the final image after considering the effect of both lenses?
- b) What must the object distance be for the converging lens in order for the final image distance (again, considering the effect of both lenses) to be infinity?

4. (25 pts) A thin film ( $n = 1.65$ ) is applied to a glass surface ( $n = 1.50$ ). If the coating has a thickness of 520 nm, find the wavelengths of light in the visible spectrum (from 400 - 700 nm) that experience destructive interference when transmitted through the glass. Not reflected!