Physics 10164 - Summer 2019 - Exam #3A

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.

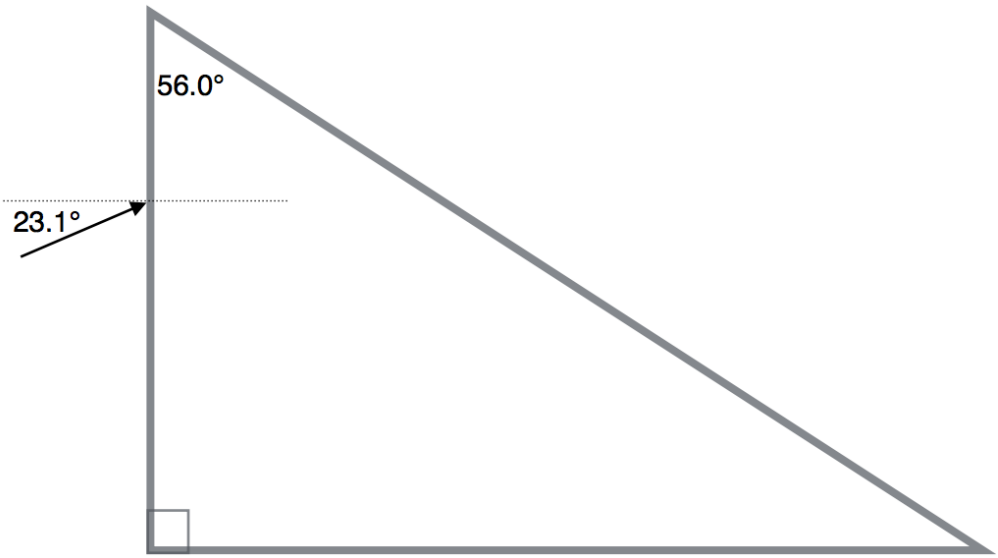
1. (25 pts) The intensity of sunlight that reaches the Earth's surface at our latitude at noon on a sunny day is approximately 980 Watts/m^2.

a) What is the rms value of the electric field for this light?
b) How much energy is contained in a volume of space above us that is equal to a cube of Tarrant County (a cube 31 miles on each side)?
c) How much time would it take for this sunlight to deliver 1.0 kw-hr of energy to a solar panel array of area 7.5 m^2, assuming 100% efficiency?

2. (25 pts) An object is placed 85 cm in front of a mirror, and an image is formed 38 cm behind the mirror.

a) At what object distance would the resulting image be 55 cm behind the mirror?
b) What would be the magnification of the image in the case described in part a?

#3. (25 pts) The prism below has an index of refraction of 1.34 and is surrounded by air. Light is incident on the left face of the prism as shown. Through what face of the prism does the light exit, and what is the final angle of refraction?



4. (25 pts) A myopic person has a far point of 49 cm and a near point of 21 cm. You want to prescribe glasses for this person that will sit 2.0 cm in front of the eyes and will correct the far point for the myopic person to a normal far point value of infinity.

a) What must be the focal length of the lenses of the glasses?
b) What is the new near point for this person with these lenses?