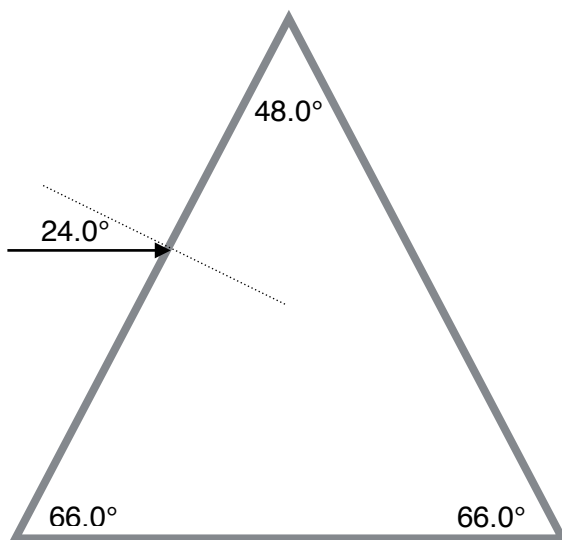


Physics 10164 - Exam 4C

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 points) White light is incident on the left edge of a triangular prism at an angle of 24.0° with respect to the normal. The index of refraction for blue light is 1.54, and the index for red light is 1.50. The prism is surrounded by air on all sides.

- What is the angle of refraction for blue light exiting the prism on the right side?
- What is the angular dispersion of light exiting the right side of the prism?



2. (25 pts) Two lenses are separated by a distance of 31 cm. The front lens has a focal length of -21 cm, and the back lens has a focal length of 15 cm. The final image formed by the two lenses is located 24 cm behind the back lens. Where is the object for this two-lens system, and what is the overall magnification?

3. (25 pts) Light of wavelength 532 nm passes through a single slit of width 0.15 mm. The light forms a pattern on the wall 8.0 meters away.

- a) What is the width (in cm) of the central maximum of the pattern?
- b) If the slit width is increased, does the central maximum of the pattern get wider or narrower? Justify your answer.

4. (25 pts) A normal person has a near point of 25 cm and a far point of infinity. A patient with hyperopia is measured to have a near point of 55 cm and a far point of infinity.

- a) What is the focal length of the lenses necessary in order for this person to have a normal near point?
- b) What is the new far point for this person with these lenses?