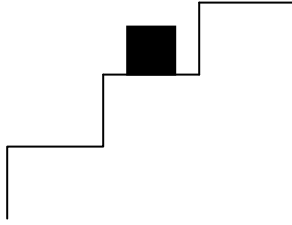


**THE LORD OF THE LENS**

*(As is tradition sketches and work with units must be used to tell the tale.)*

The strong and intelligent people of Asmi have carved their home into Mt. Optico. The mountain stands by a pure water lake. It has a three tier side facing the lake and a sheer cliff on the other. Captain Idnob is stationed on the second tier standing guard looking out over the water. His position is given by the sketch below.



Nosnarb the giant ferocious dragon awakens every year on the first morning of spring with a ravenous appetite. He flies straight to the land of the Asimians to feed on members of the Royal Family for only their rich blood can start their metabolism for the summer feeding season.

1. Captain Idnob alerts the community by shining his signal light beam through the mountain to the royal quarters 2.00miles below at a  $4.00^\circ$  angle of incidence away from the lake. How far in meters will the light beam travel to get to the quarters and how long will it take?
2. Tragically, the warning light strikes the emerald left eye of Nosnarb. Nosnarb quickly turns his attention to the Captain and swoops down and devours him. Explain how the signal beam that was aimed down at the quartz could end up hitting the dragon above and behind the sentry.
3. Queen Einahpets receives the warning and rushes to vault to gather her weapons. The locking mechanism works by shining a light through a hole in a spinning disk. On the same axis a second disk is 2.500m spinning behind the first with a hole  $1/60$  of a degree trailing the first hole. What speed must the queen set the disk spinning so the light will pass to the door triggering mechanism and open the vault door?

4. The dragon passes by a quartz lens window in Prince Neralcam study. The dragon looks in hoping to get a glimpse of his future meal. The prince sees a perfectly focused eyeball. The prince is standing 1.50m from the center of the lens. The lens has a 2.00m curvature on the incidence side and a -2.00m curvature on the refracted side. How far is the dragon from the center of the lens?

5. If the dragon's eye appears to be 1.00m in diameter how big is it really?

6. Make a scale ray diagram to accurately describe what the prince sees.

7. Nosnarb spies Prince Bob fishing. The dragon is able to shoot laser light with a wavelength of 511nm from two glands on his nose spaced .050cm apart. If Prince Bob is standing directly in front of the dragon when it fires the laser at 1101m, how far to the left or right should he move to survive the blast?

8. Queen Einahpets leads the Asmian army to the top of the mountain. Each carries a round shield with a curvature of 10.0m and a large flat shiny sword. Now you must finish the story. Using light properties and accurate diagrams narrate and illustrate the fate of the brave and learned people.