Reflection from a Plane Mirror Problems

1. In the space below draw several light rays coming out of each of the headlights, reflecting them off both the wet and dry surfaces (do this carefully, using normals for each reflection).

   ![Reflection diagram](image)

   Explain why it is much harder to see the road ahead of you at night when it is raining than when it’s dry.

   *You can only see light going to your eyes*

2. The astronauts put a corner-reflecting mirror on the moon. This is a combination of mirrors that are joined at 90° angles – like the photo to the right. The mirrors on the moon are designed to reflect laser beams sent from the Earth directly back along a line parallel to the path they came on. The perpendicular lines below represent two plane mirrors at right angles. Complete the drawing and then bring in another ray in a direction of your own choice, again completing the path, in order to illustrate this property of corner reflectors.

   ![Corner reflector diagram](image)
3. What is the minimum length of a plane mirror used to fully view your body? Assume the mirror will be vertical, not tilted, and in front of you. Use the mirror below including a careful placement of rays incident upon and reflecting from a mirror, as well as an explanation of how you used what you learned in the lab to answer this question. (Hint: There is a definite minimum size and it is not the height of your body.)

4. Explain clearly and quantitatively how plane mirrors put on walls can make rooms look larger.

5. If you had a laser pointer and pointed the laser so that when it hit the mirror the beam made an angle of $25^\circ$ with the surface of the mirror, what would be the angle between the incident and reflected light rays? Draw a diagram as part of your explanation.

6. When you find yourself in a place like a clothing department store or the funhouse at a carnival where you can put your body in between two plane mirrors facing each other, it’s fun to look at the dozens of images of yourself that go off to infinity in each mirror. Maybe you never noticed, but they get dimmer and dimmer. Why do you suppose? Give a careful explanation.