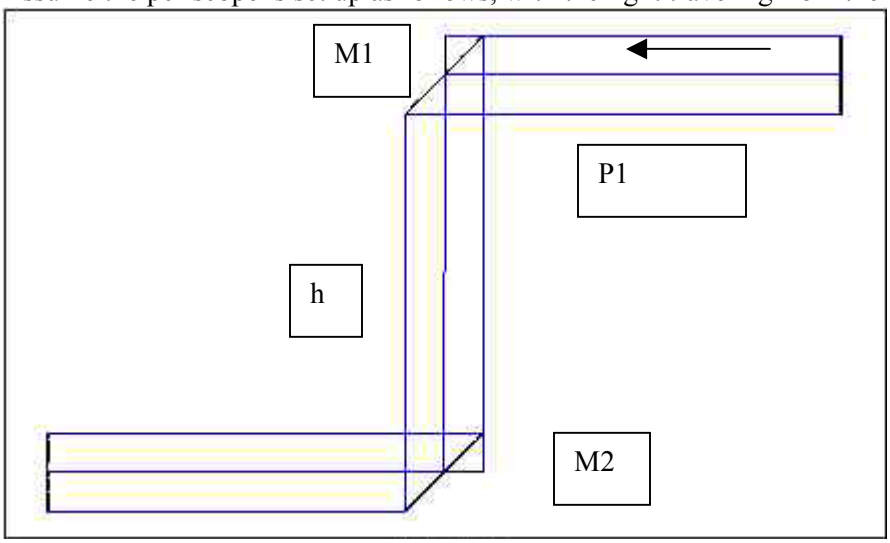
I have a question that states:

A periscope is useful for viewing objects that cannot be seen directly. Suppose the object is a distance p1 from the upper mirror and that the two flat mirrors are separated by a distance h. What is the distance of the final image from the lower mirror? Is the final image real or virtual? It is upright or inverted? What is its magnification? Does it appear left right reversed?

I figured it was not reversed because I thought the first mirror would reverse it, and the second would re-reverse it. I figured it was also unmagnified, virtual, and upright since that is a characteristic of planar mirrors. The distance is what I'm having a problem with. I know that the image of the first mirror is p1 (also the magnitude of q) above the first mirror. The image of the first mirror acts as the object for the second mirror. The image for the second mirror is some distance to the left of the second mirror. But I don't know how to find the second image distance. Any help is appreciated. Thanks!!

Jen

Assume the periscope is set up as follows, with the light traveling from the right:



The first mirror will form a virtual image of the object at P1 directly above the first mirror. This image will have Up-Down inversion. The distance to the second mirror is h. The distance from the virtual image formed by mirror 1, to mirror 2 is then P1 + h. The virtual image formed by mirror 2 is then formed to the right of mirror 2 at a distance of P1+h. This image will have another Up-Down inversion, canceling the first. If we assume the distance from the second mirror to the observer is the same as P1, the final image distance is 2 X P1 + h. The image is correctly oriented (left, right, up and down), and (in this instance) virtual. In real life, a periscope has image forming optics (lenses, prisms, etc.;) that will form real images, which are then viewed by eyepieces.
Bill