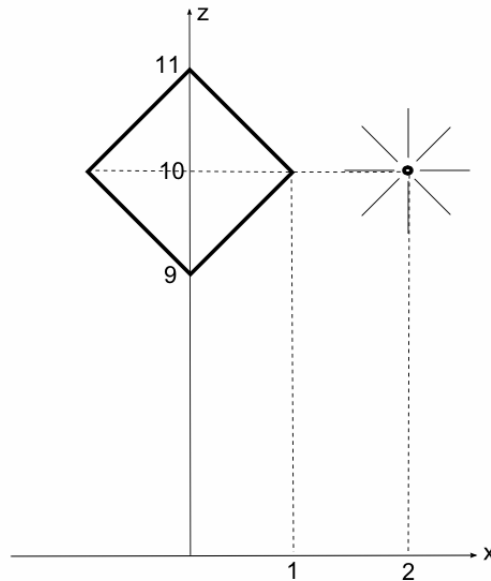2. The diagram below shows the crossection in the xz plane of a three dimensional scene. The Lambertian object in the center has a square crossection which is constant for all y. This object is illuminated by a line source of light (like a thin florescent tube) oriented parallel to the y axis, so it appears as a single point at x=2, z=10 in this crossection.

(a) What point (x,y) in the image plane will be illuminated the brightest by the light reflected from the object? Use orthographic projection. Explain your reasoning.

(b) Compute the ratio of irradiance at the point (x,y)=(1/2,1/2) in the image plane to the irradiance at the point (1/4,1/4).

3. Suppose you have a robot equipped with a stereo camera pair where you could control both rotation of the baseline ("neck" rotation) and rotation of each camera relative to the baseline ("eyeball" rotation).

(a) The Barth-Tsuji algorithm needs only one camera. Devise an algorithm for egomotion estimation for your robot which uses its stereo camera setup. For maximum credit, your algorithm should work even when there is just a single visible scene feature (eg. one black dot on a featureless white wall). Barth-Tsuji fails in that case. You need not specify all the mathematical details, explaining how your method works to estimate egomotion is sufficient.

(b) Comment on the degrees to which your algorithm adheres to these four paradigms: Marr, purposive vision, animate vision, active vision.