

5. (16 points) A directional microphone is mounted on a stand facing a wall. The sensitivity S of the microphone to sounds at point X on the wall is inversely proportional to the square of the distance d from the point X to the mic, and directly proportional to the cosine of the angle θ . That is, $S = K \frac{\cos \theta}{d^2}$ for some constant K . (See the diagram below.) How far from the wall should the mic be placed to maximize sensitivity to sounds at X ?

