

A unit cube  $ABCDEFGH$  (see the *figure*) is cut by a plane  $\mathcal{S}$  that intersects the edges  $AB$  and  $AD$  at the points  $P$  and  $Q$  respectively, such that  $AP = AQ = x$  ( $0 < x < 1$ ). Let the common point of the edge  $BF$  and  $\mathcal{S}$  be  $R$ . What is the distance  $BR$  if  $\angle QPR = 120^\circ$ ?

