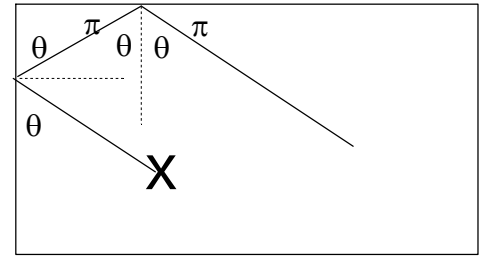


13. Since cushions are smooth and vertical, velocity parallel to cushion is preserved on impact so disc always rebounds at the same angle as it strikes cushion (see diagram) By elementary geometry it follows that the path after two bounces is parallel to the initial path.



Clearly in order to arrive back at starting point the path must be a parallelogram

So $\frac{AP}{AQ} = \frac{BR}{BQ}$ and $BR = PD$

i.e. $\frac{AQ}{BQ} = \frac{AP}{PD} = \frac{z}{1}$

so he must aim at the point dividing the second side in the ratio $z : 1$

As z varies we will get a series of parallelograms, two of which will pass through a given point not on a cushion. e.g. points X in diagram, so there will always be two different ways to perform the shot.

