

Questions about vectors

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1 Suppose the universe was designed by Euclid and not Einstein. Take a rigid (i.e. non-foldable) chess board, and place it on Charon, the moon of Pluto. Show that wherever you are, and whenever you are, the sum of the squares of the distances from the tip of your nose to the centres of the black squares of this chess board is the same as the sum of the squares of the distances from the tip of your nose to the centres of the white squares.

2 Consider a triangle with vertices at A , B and C . The *altitudes* of the triangle are line segments from each of the three vertices, dropped perpendicularly to the opposite sides (extended if necessary). Show that the three altitudes are concurrent (go through a single point).