STEP II, 1998, Q8

8 Points A, B, C in three dimensions have coordinate vectors **a, b, c**, respectively. Show that the lines joining the vertices of the triangle ABC to the mid-points of the opposite sides meet at a point R.

P is a point which is **not** in the plane ABC. Lines are drawn through the mid-points of BC, CA and AB parallel to PA, PB and PC respectively. Write down the vector equations of the lines and show by inspection that these lines meet at a common point Q.

Prove further that the line PQ meets the plane ABC at R.