**Q3**

For line L to be entirely within the interior of triangle ABC, every point on L must lie within the bounded region defined by the sides of ABC, not touching or crossing these sides.

Assume the line L is completely contained in the interior of a triangle ABC.

Since a line extends infinitely in both directions and triangle is a closed shape, it must intersect at least two sides of the triangle ABC.

But if L intersect with two sides of the triangle ABC, there are at least two points on L that are not in the interior of triangle ABC but rather on its boundary. This contradicts the assumption that line L is completely contained within the interior of triangle ABC, as having points on the boundary means the line is not entirely in the interior.

Q4

**Half-plane**: Let S be half-plane, L be boundary. Consider A, B ∈ S and C is a point between A, B. If C ∉ S then C lies on the another side of half-plane. Thus AC intersect L with point T and A, C, T are colinear. We know that ACB is colinear, thus ATB is colinear by betweenness principle. This implies that A B are on opposite sides of plane, not both in set S, which is a contradiction.

Intersection for numbers of convex sets: A∩B, where A and B are any two convex sets. Let a,c be points in A∩B. Then, the segment ab⊆A and ab⊆B⇒ab⊆A∩B.

Interior of an Angle: Angle is the intersection of two half-plane. For half-plane S1 and S2, using intersection for numbers of convex sets