Regarding three points in a plane such that two points are non-equidistant from the third point and a predicted property of any curve in that plane connecting the two non-equidistant points

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Abstract: In this paper, we give a simple proof that if there are two points A and B that are at distinct linear distances from a third point C (AC is not equal to BC), then any curve connecting the points A and B (this curve lies within the same plane containing A,B,C) must contain points such as D that lie at an intermediate distance from C, (DC is of length intermediate to AC and BC).

Proof:

Consider a plane with three points A,B,C.

Let, length (AC)< length (BC) (so A is closer to C than B is to C)

Draw a circle (in the same plane as A,B,C) with radius = length(AC) with center C and A will lie on it.

Draw a circle (in the same plane as A,B,C) with radius = length (BC) with center C and B will lie on it.

Join the points A and B by ANY curve that lies within the same plane as points A,B,C.

Choose any arbitrary intermediate length "d" such that length (AC) < d < length (BC)

Draw a circle of length "d" whose centre is C (in the same plane as A,B,C).

So we have three concentric circles in the same plane with centre at C, with increasing radii of length AC, length "d", length BC. A lies on the innermost circle whereas B lies on the outermost circle. Any curve within that plane that joins points A and B must intersect with the intermediate circle of radius length "d" at least once let us say at point D. So D is a point on the curve connecting A and B (in the same plane as A,B,C) such that the distance of D from C is intermediate to the distance of A from C and B from C.

Since the length "d" of any intermediate size between AC and BC may be chosen, therefore any number of points that lie at intermediate distances from C (between length(AC) and length(BC)) on the curve connecting A and B may be found.