Construction of Congruent Rhombi

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Theorem G. You can construct congruent rhombi using Brandenburg's construction if you pick another point C' that is collinear with points B and C.

Proof. Using MS. Brandenburg's construction to create a rhombus begin with line segment AB. Construct a circle around point A that passes through point B. Then construct a circle around point B that passes through point A. Pick a point C on circle BA. Construct a circle around point C that passes through point B. Choose point D where circle AB and CB intersect. Construct rhombus ABCD.

To construct a rhombus that is congruent to ABCD, start by picking a new point C' that is on circle BA and collinear with points B and C. Then construct a circle around C' that passes through point B. Choose point D' where circle AB and C'B intersect. Construct rhombus D'C'BA.

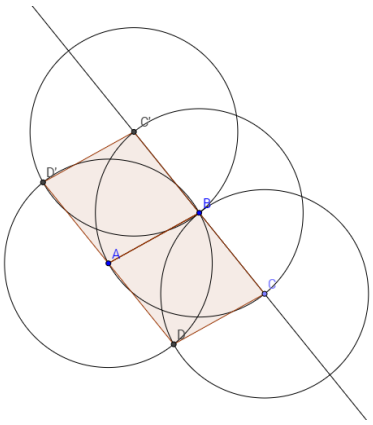

Figure 1: Congruent Rhombi ABCD and D'C'BA

Now we will prove that rhombus ABCD is congruent to rhombus D'C'BA. We know that all the sides of both rhombi are congruent because they all have the same radius length AB. Line segment DC is parallel to line segment AB because ABCD is a rhombus. Line segments DC and AB are both intersected by line segment BC. Then by Euclid I.29 we know that angle DCB is congruent to corresponding angle ABC'. Since ABCD is a rhombus we know angle DCB is congruent to angle DAB. Since D'C'BA is a rhombus we know angle ABC' is congruent to angle AD'C'. Since angle DCB is congruent to angle ABC' then we know angle DAB is congruent to its corresponding angle AD'C'.

Line segments DC and AB are also intersected by line segment DA. Then by Euclid I.29 we know that angle ADC is congruent to its corresponding angle D'AB. Since ABCD is a rhombus we know that angle ADC is congruent to angle ABC. Since D'C'BA is a rhombus we know angle D'AB is congruent to angle D'C'B. Since angle ADC is congruent to angle D'AB we know that angle ABC is congruent to its corresponding angle D'C'B. Since all the corresponding sides and angle are congruent we know that rhombus ABCD is congruent to rhombus D'C'BA. □

Refereed by: Toby Maggert