Irregular Rhombus

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Question 6.3. 6.2 says: Let ABCD be a rhombus. If angle A is congruent to B, then ABCD is regular. 6.3 asks: Does Conjecture 6.2 hold if we replace angle B by angle C ?

Conjecture 6.3. 6.2 does not hold if we know angles A and C are congruent instead of angles A and B.

Proof. In any rhombus ABCD, angles A and C are always congruent, so this says nothing about the rhombus being a square. To show this, construct a counterexample.

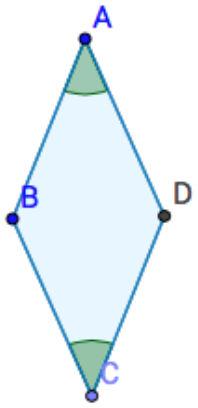

Figure 1: Let angles A and C be half a right angle each.

By Euclid I.29, we know that interior angles on the same side are equal to two right angles. This makes adjacent angles taken together equal to two right angles. For the sake of simplicity, let's pick angle A and angle B. Since together they are two right angles, and angle A is half a right angle, then angle B is one and a half right angles. Therefore angle A and angle B are not congruent, so ABCD is not regular.

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Refereed by Grace Freking.