

Construction of Kite With Two Given Sides and a Given Angle

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This proof will show that Ms. Brandenburg's construction of a kite is flexible because you can construct a kite given any length of sides and any angle measurement. Theorem I.1 will be used if you are given the angle between congruent sides of the kite. Theorem I.2 will be used if you are given the angle between non-congruent sides.

Theorem I.1. Given segments AB and BC and angle BAD, you can construct kite ABCD.

Proof. Suppose we are given line segments AB and BC and angle BAD. On segment AB construct a circle around A through B. Then use Euclid I.23 to construct angle BAD on segment BA. If needed extend the ray of the angle so it intersects with the circle around A through B and label the point where they intersect D. Construct a circle with radius BC around point B. Construct a circle with radius BC around point D. Label the one of the points where they intersect C. Construct kite ABCD.

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Theorem I.2. Given segments AB and BC and angle ABC you can construct kite ABCD.

Proof. Suppose we are given line segments AB and BC and angle ABC. On segment AB construct a circle around A through B. Then construct a circle with radius BC around B. Use Euclid I.23 to construct angle ABC on segment AB. If needed extend the ray of angle ABC so it intersects with the circle around B with radius BC and label the point of intersection C. Construct a circle around C through B. Label where the circle around C through B and the circle around A through B intersect D. Construct kite ABCD.

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