SIMPLE CONSTRUCTIONS: QUADRILATERALS

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Worked Demonstration

Goal: Construct trapezoid $ABCD$ with

$$AB = 9 \text{ cm}, \quad BC = 5 \text{ cm}, \quad CD = 4.2 \text{ cm}, \quad \angle ABC = 60°, \quad \angle BCD = 120°, \quad \text{and } CD \parallel AB.$$

Steps (ruler + protractor + compass)

Step 1: Draw base $AB = 9$ cm.

Step 2: At B, measure $\angle ABC = 60°$ and draw a ray (mark the angle).
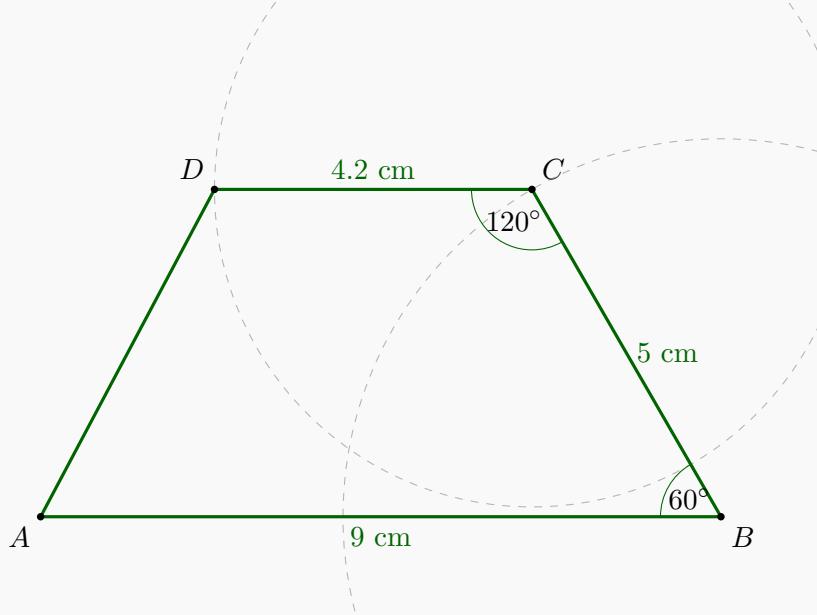
Step 3: Set the compass to 5 cm. With center B, draw an arc to hit the ray. Label that point C.

Step 4: At C, measure $\angle BCD = 120°$ (using segment CB as one side) and draw a ray for CD.

Step 5: Set the compass to 4.2 cm. With center C, mark point D on the ray.

Step 6: Draw segment AD to finish the trapezoid.
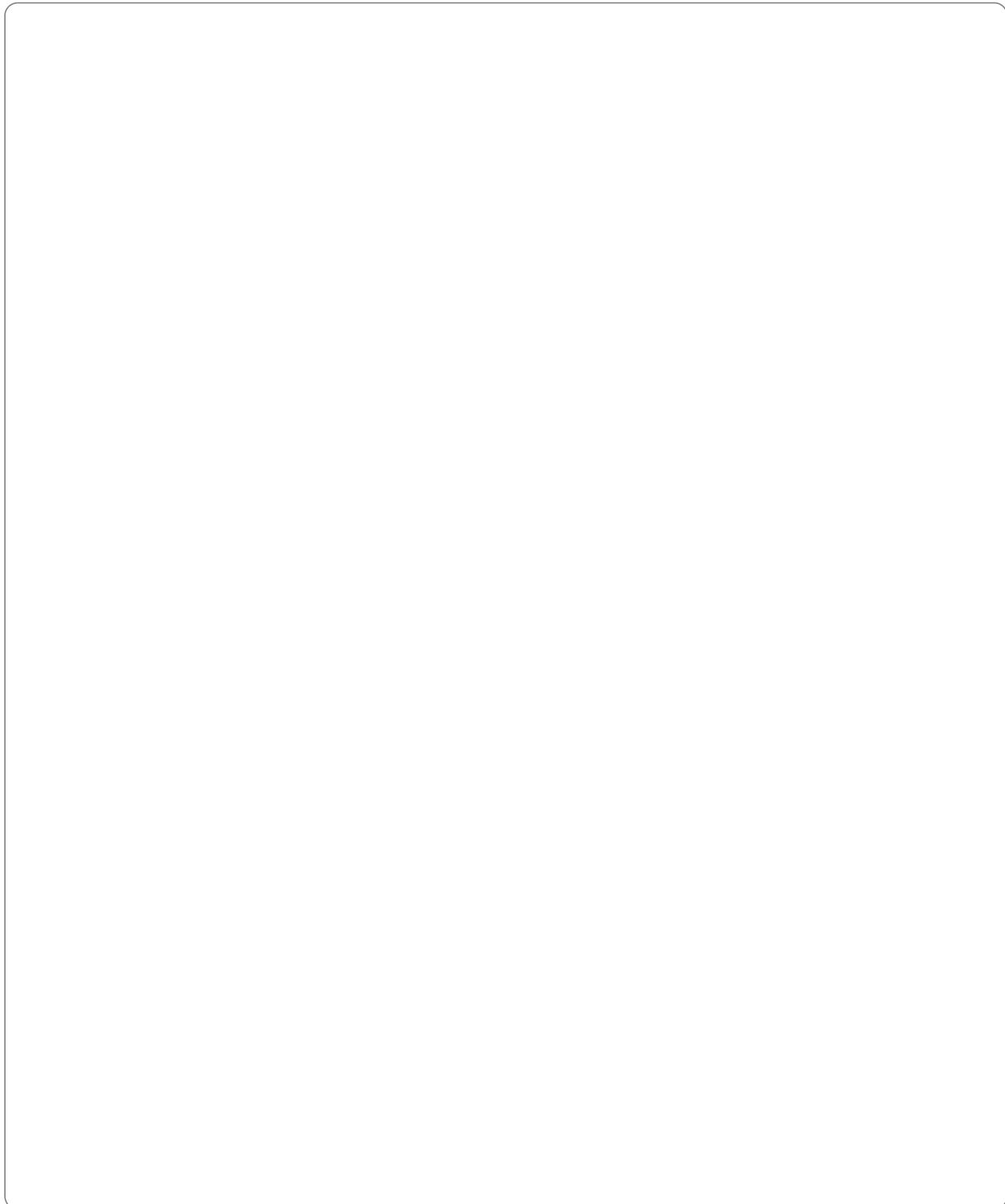
Step 7: *Check:* $\angle ABC + \angle BCD = 60° + 120° = 180°$, so the lines AB and CD are parallel.

Now You Try: Construct each quadrilateral

(1) Rectangle $ABCD$

$$AB = 5 \text{ cm}, \quad BC = 3 \text{ cm}, \quad \angle ABC = 90°$$
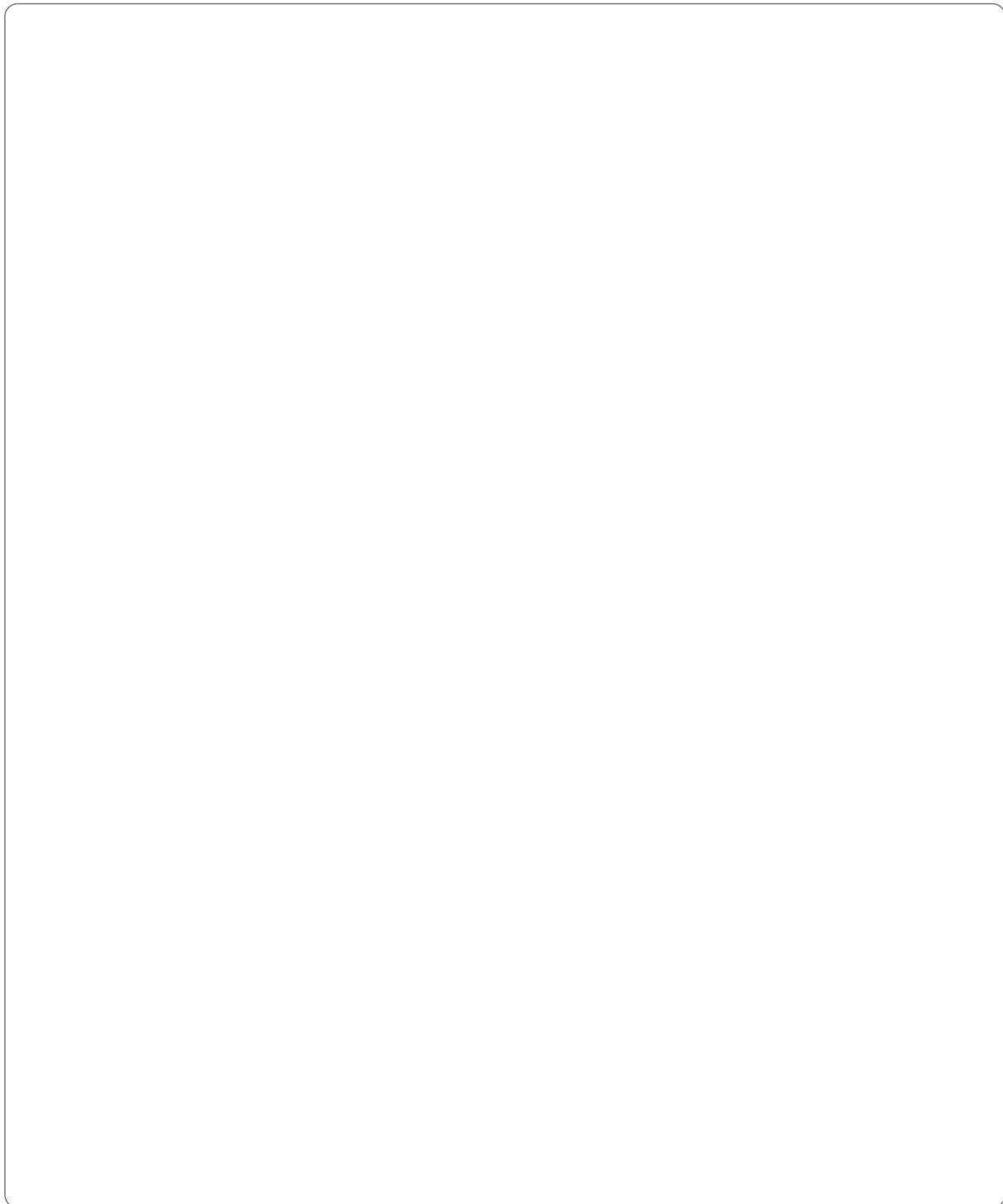
(2) Square $ABCD$

$$AB = 4.5 \text{ cm}, \quad \angle ABC = 90°, \quad AB = BC$$
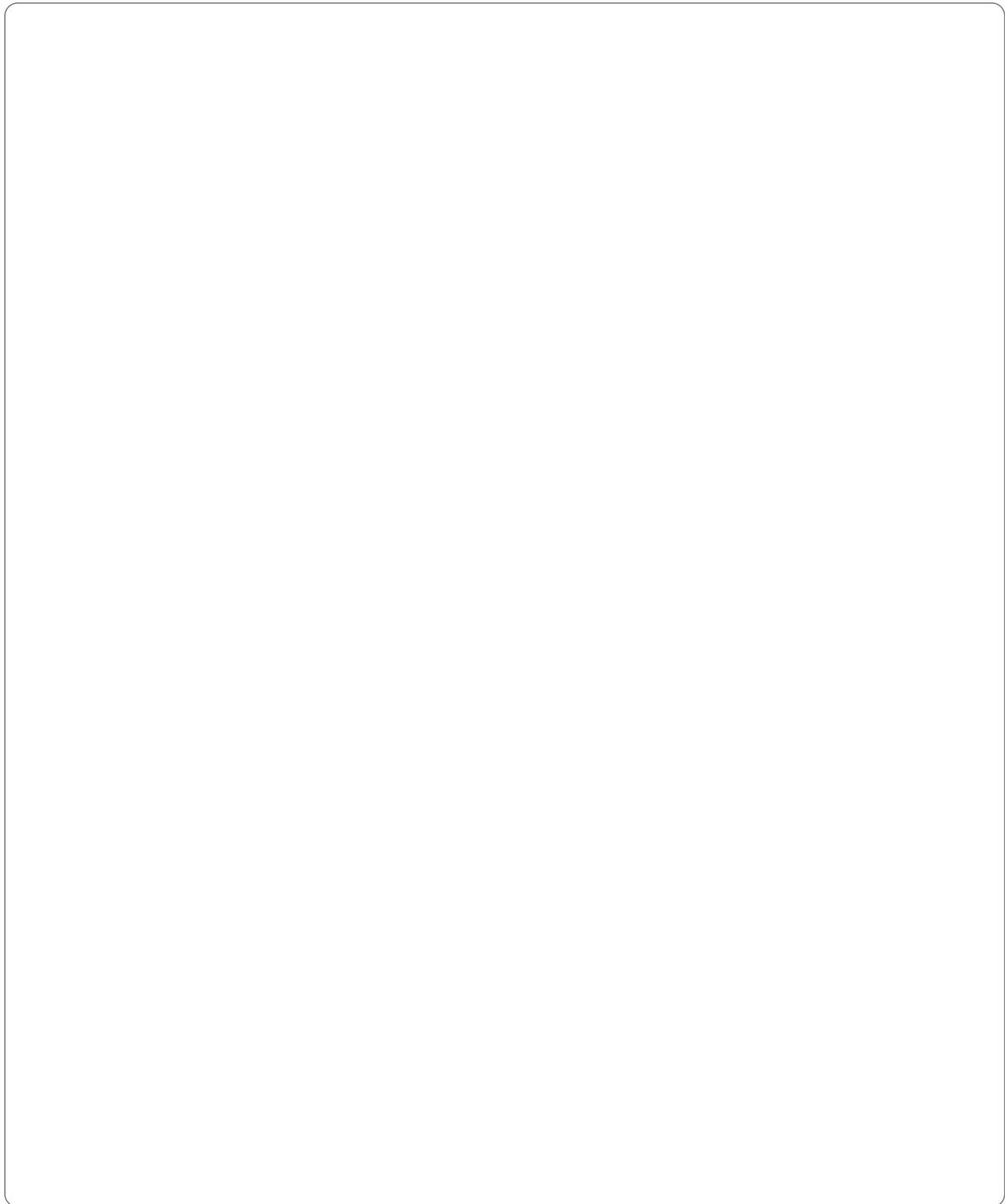
(3) Kite $ABCD$

$$AB = AD = 3 \text{ cm}, \quad BC = CD = 4.8 \text{ cm}, \quad \angle BAD = 75°$$
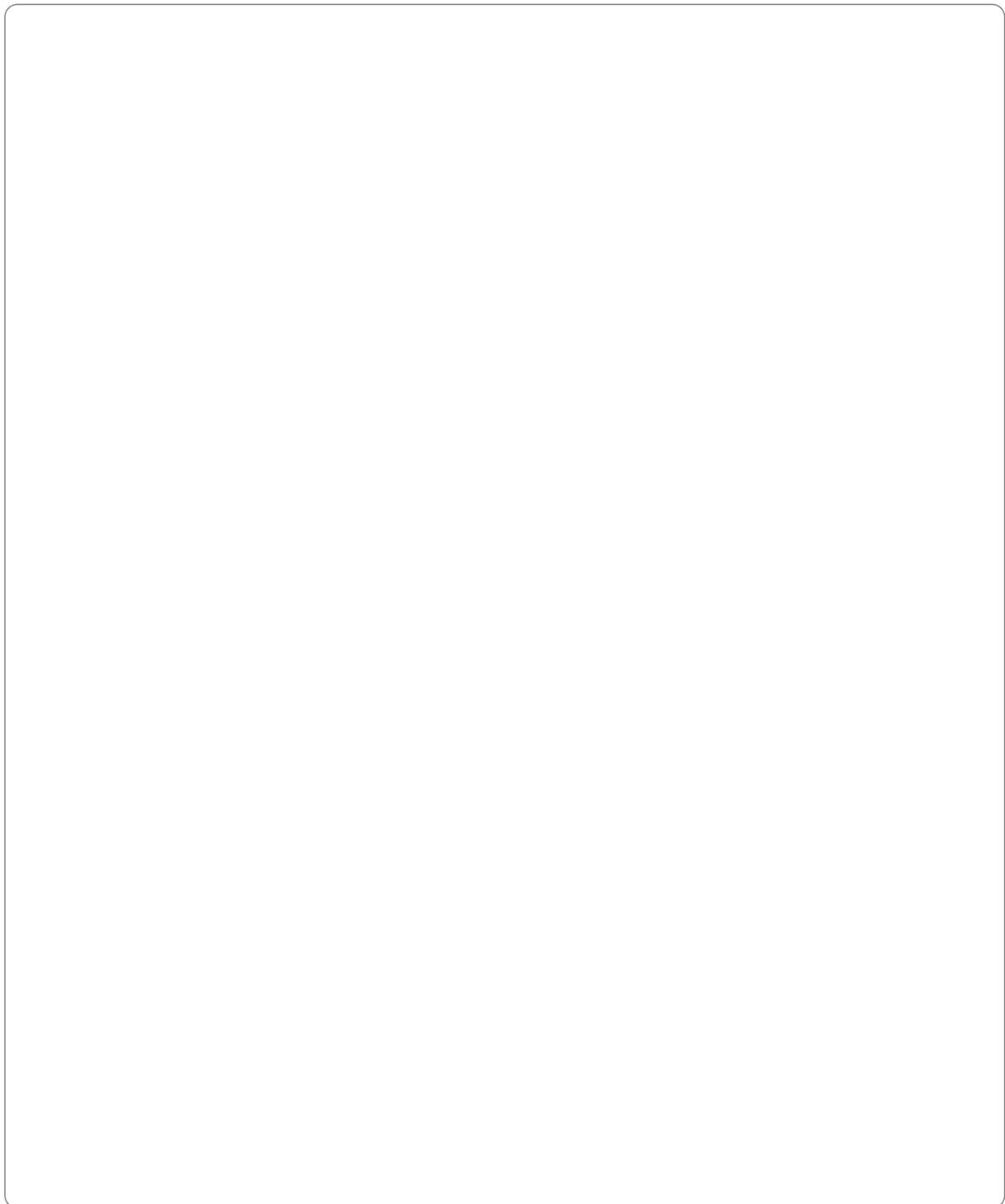
(4) Parallelogram $ABCD$

$$AB = 6.5 \text{ cm}, \quad AD = 3.2 \text{ cm}, \quad \angle DAB = 55°$$
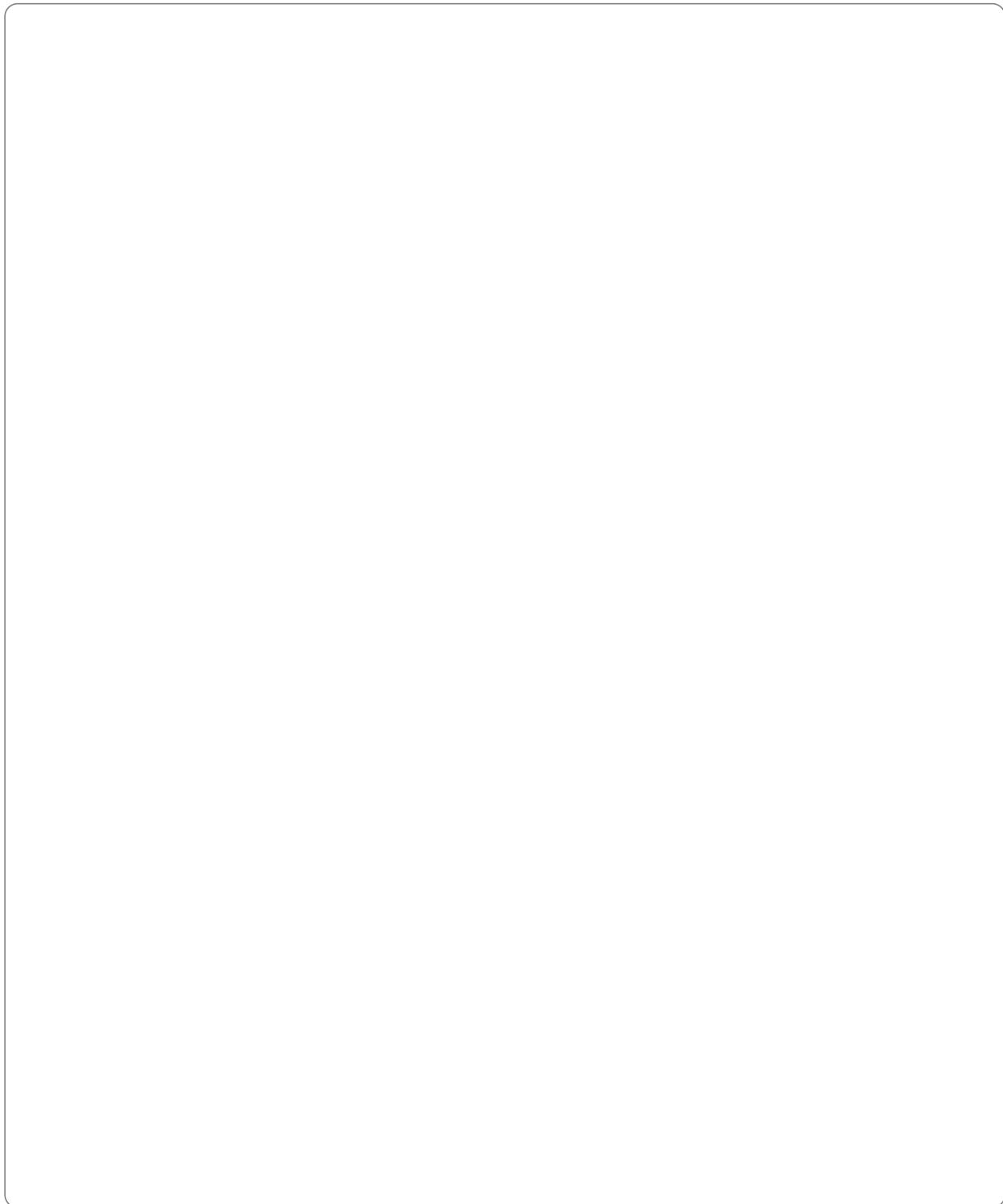
(5) Trapezoid $ABCD$

$AB = 8$ cm, $\quad AD = 3.5$ cm, $\quad CD = 5$ cm, $\quad \angle DAB = 70°$, $\quad \angle ADC = 110°$, $\quad$ and $CD \parallel AB$
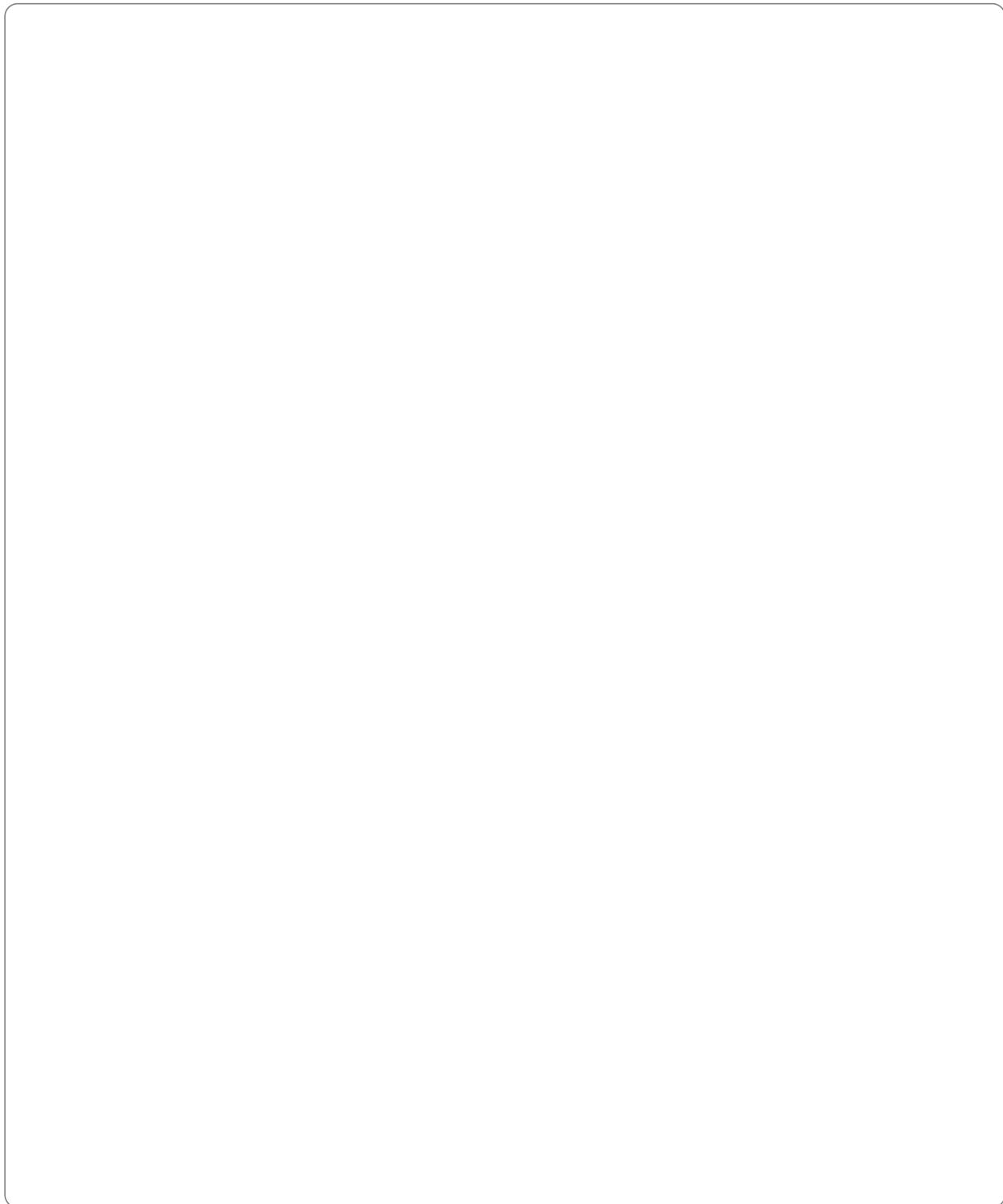
(6) Rectangle $ABCD$

$$AB = 8.5 \text{ cm}, \quad BC = 4.5 \text{ cm}, \quad \angle ABC = 90°$$

(7) Rhombus $ABCD$

$$AB = BC = CD = DA = 6 \text{ cm}, \quad \angle DAB = 65°$$

(8) Kite $ABCD$

$$AB = AD = 5.2 \text{ cm}, \quad BC = CD = 7.1 \text{ cm}, \quad \angle BAD = 50°$$

(9) Parallelogram $ABCD$

$$AB = 7.8 \text{ cm}, \quad AD = 4.6 \text{ cm}, \quad \angle DAB = 35°$$