

1.08

On Your Own

4. **Write About It** Compare the tools used for hand constructions (paperfolding, compass, straightedge) to the basic tools of geometry software. How are they similar? How are they different? Do you think you can do more with one set of tools than with the other? Explain.
5. In Step 4 of the windmill construction (see the Example), why was it necessary to *construct* the line parallel to \overline{BC} rather than *draw* it parallel to \overline{BC} ?
6. Why did you need the circle to construct the windmill?
7. **Standardized Test Prep** Naima is frustrated. Her geometry software does not have a command that constructs a line tangent to a given circle. Which of the following methods can Naima use to construct a line that is tangent to a circle with center O so that point P on the circle is the point of tangency?
 - A. Construct the perpendicular bisector of \overline{OP} .
 - B. Construct the line that is perpendicular to \overline{OP} at point O . Let Q be one point where this line intersects the circle. Construct \overrightarrow{PQ} .
 - C. Construct a line through P that is parallel to a diameter of the circle and that intersects the circle in two points.
 - D. Construct the line through P that is perpendicular to \overline{OP} .



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10. **Standardized Test Prep** The students in Ms. Lau's class used geometry software to construct a specific type of quadrilateral that keeps its required features if someone drags one of the vertices.
- Jeremy's group constructed a parallelogram with congruent adjacent sides.
 - Amy's group constructed a quadrilateral with diagonals that bisect the quadrilateral's angles.
 - Alexandra's group constructed a quadrilateral with four congruent sides.
 - Sang's group constructed a quadrilateral with diagonals that are perpendicular and intersect each other at their midpoints.

Which type of quadrilateral did each group construct?

A. a rectangle B. a square C. a rhombus D. a trapezoid

11. **Write About It** As you learned to use geometry software, you probably also did some geometric thinking. List some geometric ideas, terminology, or techniques that you learned, relearned, polished up, or invented.
12. No geometry software allows you to construct a line that is perpendicular to another line or segment unless you first identify both a line (or a segment) *and* a point. Why is this a sensible restriction?
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13. **Write About It** Select one of the UnMessUpable figures you constructed in Exercises 1–8. Write detailed directions that describe the construction process. To test your directions, switch with a partner. Do you both get the predicted results?
14. Look back at Exercise 4. How do you make sure that the triangle you construct is equilateral? Describe what features of the construction or the resulting figure guarantee that the triangle has three congruent sides.

- b. The figure at the right illustrates a special ratio for a particular type of rectangle. If you divide this type of rectangle into a square and a smaller rectangle, as shown, the length-to-width ratios of the large and small nonsquare rectangles are equal. In fact, you can divide the smaller rectangle into a square and an even smaller rectangle. The length-to-width ratio of the smaller rectangle is the same as the length-to-width ratio of the first two rectangles. What is the numerical value of this length-to-width ratio?

