

1.8 Drawings vs. Constructions

Objectives:

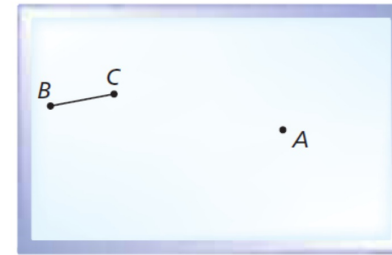
- Use geometry software to construct figures.
- Explain the difference between a construction and a drawing.

Example

Constructing a Windmill

Step 1 Open a new sketch page on your computer.

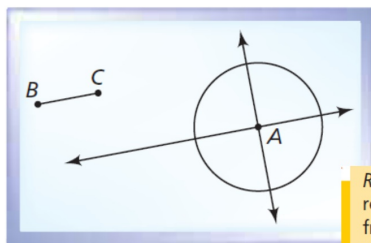
Step 2 Place point A on your screen. Then construct \overline{BC} . Your screen should now show four objects: three points, A , B , and C , and one segment, \overline{BC} .



Step 3 Use the appropriate tool to construct a line through A that is perpendicular to the line containing \overline{BC} . The line should stay perpendicular to \overline{BC} no matter how you move A , B , or C .

Step 4 Construct a line through A that is parallel to \overline{BC} .

Step 5 Construct a circle centered at A with radius \overline{BC} . If you stretch or shrink \overline{BC} , the circle should stretch or shrink, accordingly. Again, you need a special tool for this construction. (Keep this sketch for Exercise 1.)



Radius of a circle usually refers to a segment from the circle's center to a point on the circle. Radius of the circle usually refers to the length of a radius.

For Discussion

1. What happens when you use the selection tool to move A , B , and C ?

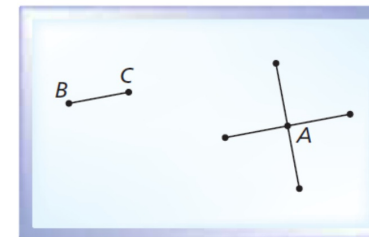
Check Your Understanding

In the Example you constructed a windmill. Follow Steps 1–3 below to clean up the construction. Refer to the diagram in Step 5 of the Example. You will use the windmill in Exercises 1 and 2.

Step 1 Place points where the circle intersects the two lines.

Step 2 Construct segments from the center of the circle to each intersection point.

Step 3 Hide (do not delete) the circle and the lines. Do not hide the segments.



- Describe what happens to the segments when you rotate \overline{BC} .
 - Describe what happens to the segments when you stretch or shrink \overline{BC} .

- Most geometry software allows you to trace the position of an object as you move it. Activate the Trace feature for the four points at the end of your windmill. Then move point B and watch what happens. Describe the effect.
- Use geometry software to draw two intersecting segments. Move them until they look about the same length and perpendicular to each other at their midpoints. Move one of the endpoints. How is your sketch affected when you move this point, compared to how your construction is affected when you move point B ?

On Your Own

Practice problems p.41 (5-7)

- 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} ?
- Why did you need the circle to construct the windmill?
- 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?
 - Construct the perpendicular bisector of \overline{OP} .
 - Construct the line that is perpendicular to \overline{OP} at point O . Let Q be one point where this line intersects the circle. Construct \overline{PQ} .
 - Construct a line through P that is parallel to a diameter of the circle and that intersects the circle in two points.
 - Construct the line through P that is perpendicular to \overline{OP} .