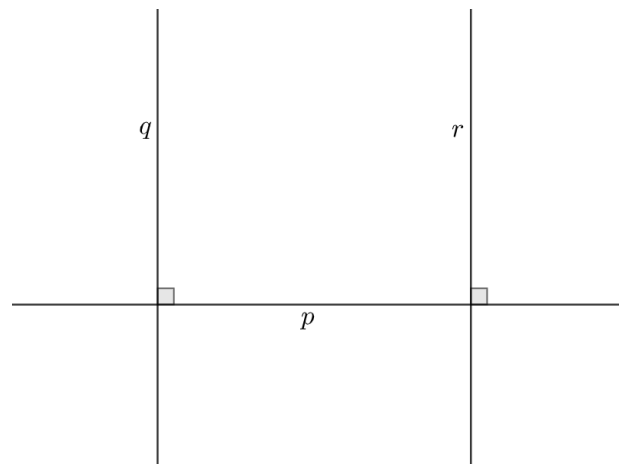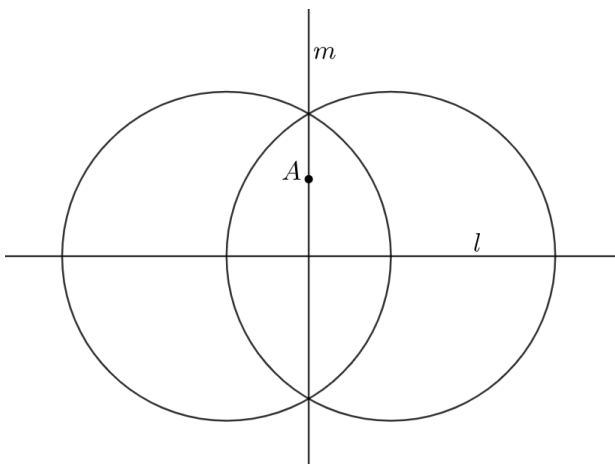# Lesson 1.04
# Constructing Lines

### Geometry GT

## Analyze

Consider the two figures below.



What do you notice about each figure? What do you wonder?

## Explore

How does the following figure differ from the starting figure for creating a perpendicular bisector?

$P$ •

*l*

Use compass and straightedge moves to construct a line that is perpendicular to line $l$ and goes through point $P$. You may extend line $l$ if necessary.

$P$ •

$l$

## Discuss

How would the construction change if point $P$ was on line $l$?

Use compass and straightedge moves to construct a line that is perpendicular to line $l$ and goes through point $P$. You may extend line $l$ if necessary.
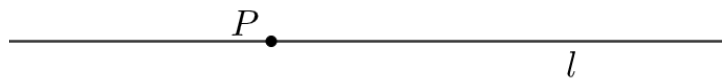
$P$ •

$l$

To the right, write precise instructions for constructing a line that is perpendicular to a given line and goes through a specific point.

<u>Perpendicular line through a point</u>

**Definition**

**Parallel lines**: two lines that do not intersect at any point

# Demonstrate

Use compass and straightedge moves to construct a line that is *parallel* to line $l$ and goes through point $P$. You may extend line $l$ if necessary.
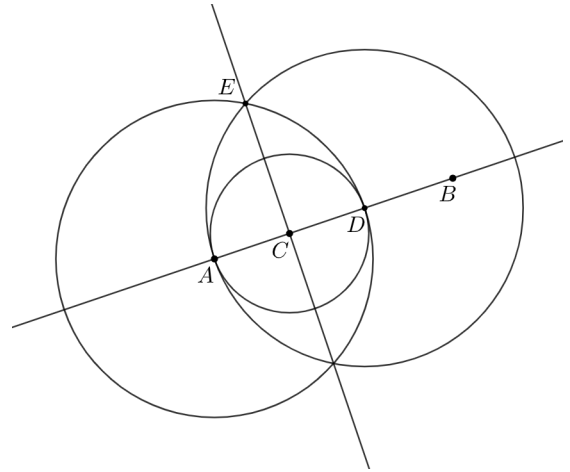
$P$ •

$l$

## Practice

**1.** This diagram is a straightedge and compass construction of a line perpendicular to line $\overleftrightarrow{AB}$ passing through point $C$.

    **A.** Which segment has the same length as segment $\overline{AE}$?

    **B.** Explain why it was helpful to construct points $D$ and $A$ to be the same distance from $C$.

**2.** Two distinct lines, $l$ and $m$, are each perpendicular to the same line $n$. Select **all** the true statements.

    **A.** $l \perp m$

    **B.** $l \perp n$

    **C.** $m \perp n$

    **D.** $l \parallel m$

    **E.** $l \parallel n$

    **F.** $m \parallel n$

**3.** Siena wanted to construct a line perpendicular to line $l$ through point $C$. The diagram shows her construction. What was her mistake?