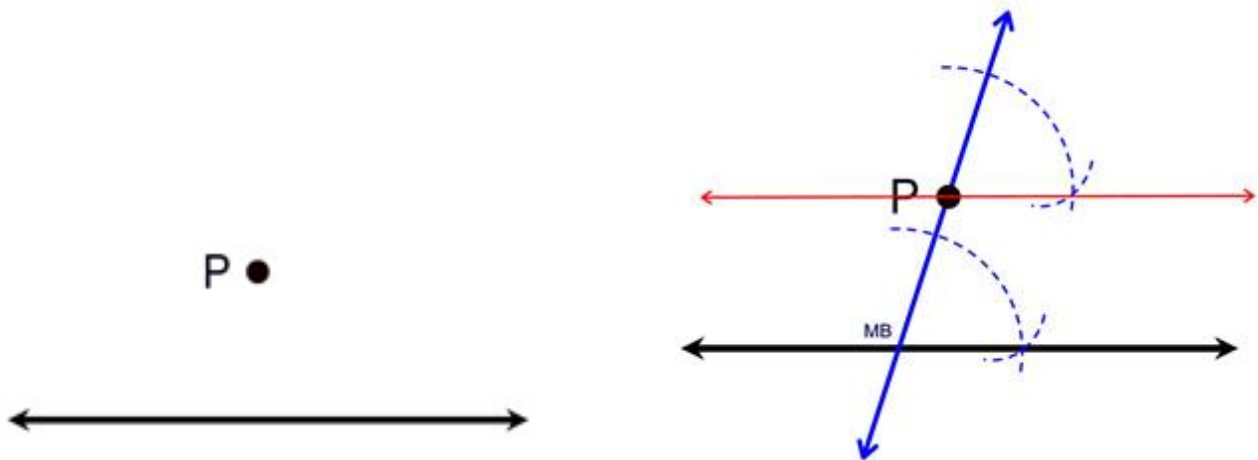


Our unit on constructions continues! Off we go.

Let's construct some parallel lines when we are given a line and a point (not on that line).

**STEPS:**

1. Using your straightedge, draw a transversal through point  $P$ . This is simply a straight line which passes through  $P$  and intersects with given line. Drawing the line slanted will make the construction easier than if you draw the line vertical. Be sure to draw the line well above  $P$ .
2. Using the construction COPY AN ANGLE, construct a copy of the angle formed by the transversal and the given line such that the copy will be located UP at point  $P$ . The vertex of the copied angle will be point  $P$ .
3. When you draw the line to complete the angle copy, you will be drawing a line parallel to the given line.



Now try again on your own:

$A$ .

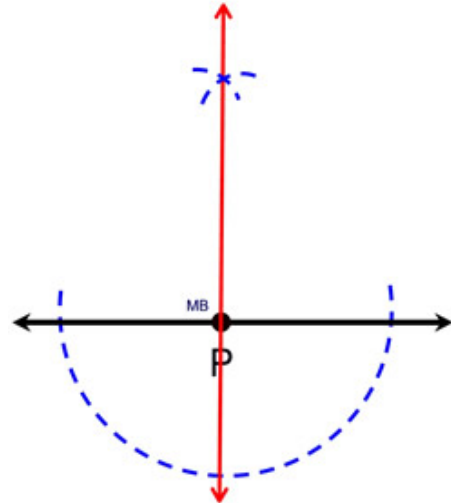
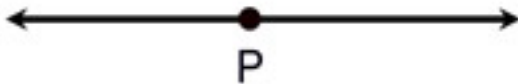
$\ell_1$  \_\_\_\_\_

We will now construct **perpendiculars** from a point on a line and a point off a line.

First, a perpendicular from a point on a line.

**STEPS:**

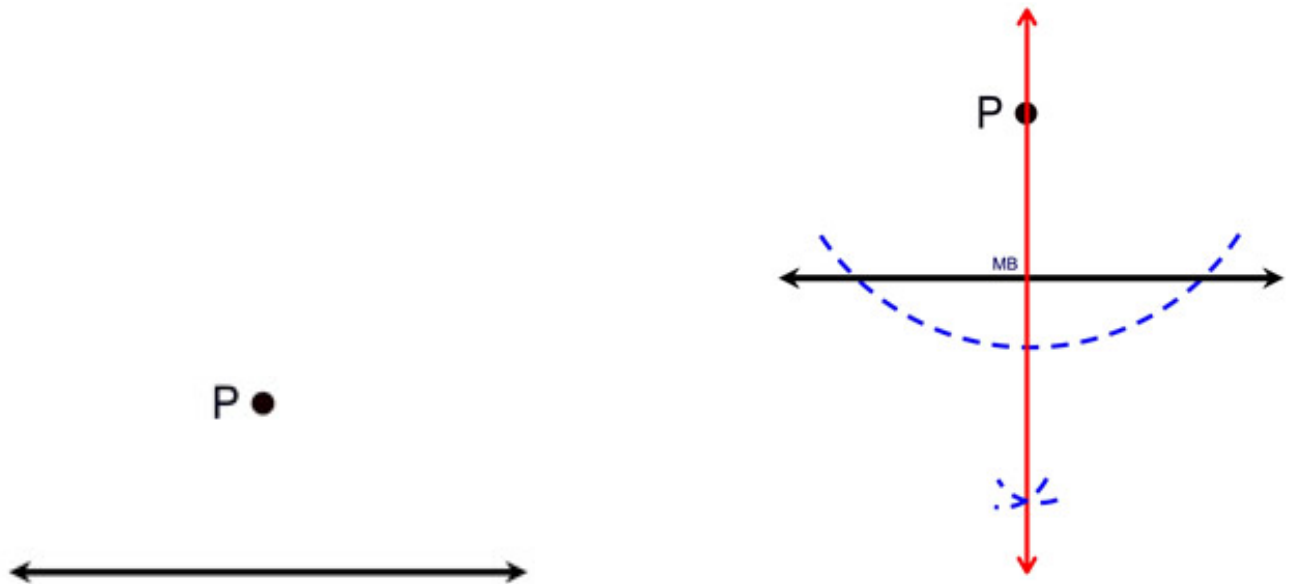
1. Place your compass point on  $P$  and swing an arc of any size below the line that crosses the line twice. You will be drawing at least a semicircle. (*Note: While you can draw this arc above or below the line, below the arc keeps the construction lines from bumping into one another.*)
2. **Stretch the compass LARGER!**
3. Place the compass point where the arc crossed the line on one side and make a small arc above the line (the arc could be below the line if you prefer).
4. **Without changing the span on the compass**, place the compass point where the first arc crossed the line on the OTHER side and make another arc. Your two small arcs should be intersecting.
5. Using a straightedge, connect the intersection of the two small arcs to point  $P$ .



Now, a perpendicular from a point off a line.

**STEPS:**

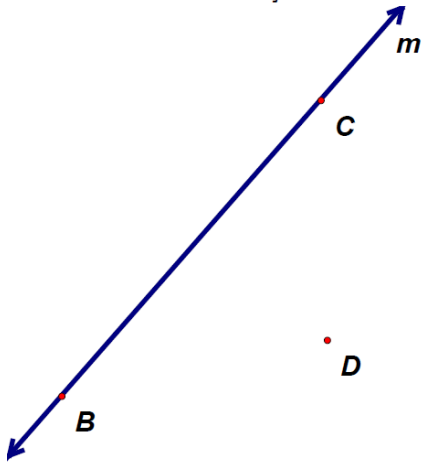
1. Place your compass point on  $P$  and swing an arc of any size that crosses the line twice.
2. Place the compass point on one of the two locations where the arc crossed the line and make a small arc below the line (on the side where  $P$  is not located).
3. Without changing the span on the compass, place the compass point on the other location where the first arc crossed the line and make another small arc below the line. The two small arcs should be intersecting (on the side of the line opposite of point  $P$ ).
4. Using a straightedge, connect the intersection of the two small arcs to point  $P$ .



**Homework:**

1.

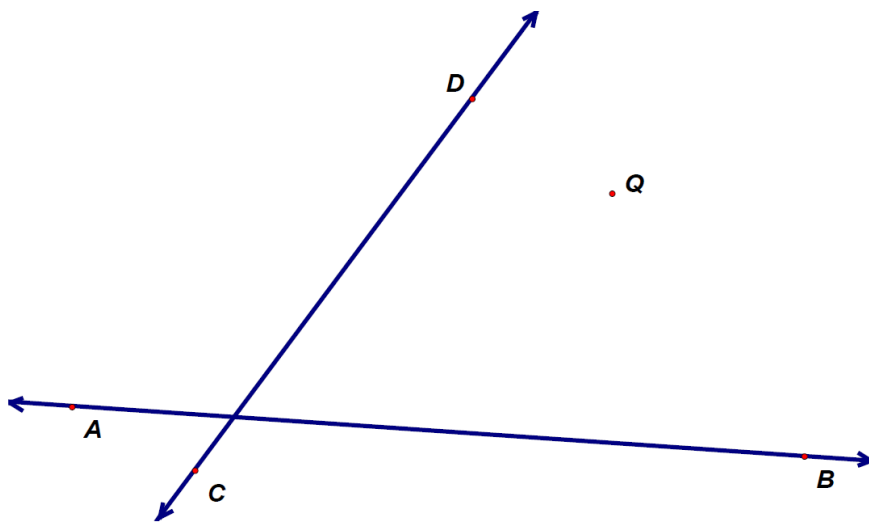
Using a compass and straightedge, construct a line that passes through point  $P$  and is parallel to line  $m$ . [leave all construction marks]



2.

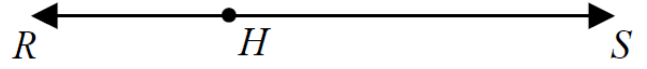
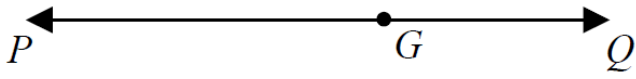
a) Construct a line parallel to  $\overline{AB}$  through  $Q$ .

b) Construct a line parallel to  $\overline{CD}$  through  $Q$ .



3.

Construct a line through  $G$  and  $H$  perpendicular to  $\overleftrightarrow{PQ}$  and  $\overleftrightarrow{RS}$ .



4.

Construct a line through  $J$  and  $K$  perpendicular to  $\overline{AB}$  and  $\overline{CD}$ .

•  $J$

•  $K$

