

Constructions:

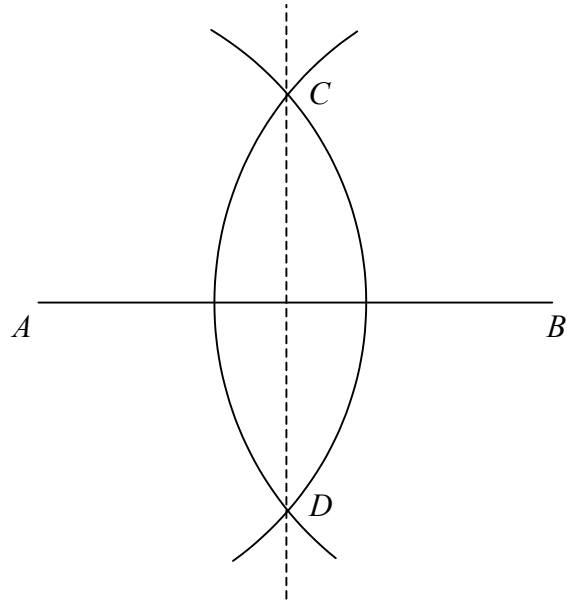
1.2 Perpendiculars

In this section, we will discuss three different cases for constructing perpendicular lines.

CONSTRUCTION #4: Construct the perpendicular bisector of a given segment.

Given \overline{AB} , construct the perpendicular bisector.

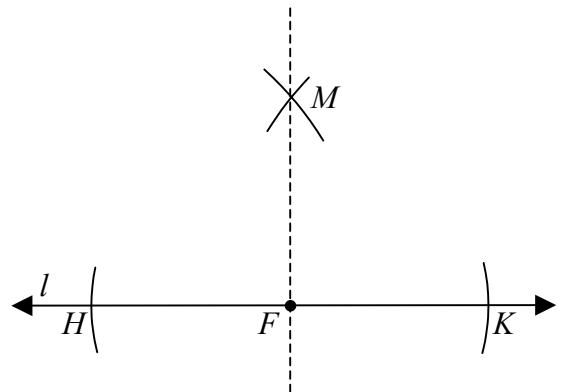
1. Choose any convenient setting that is more than $\frac{1}{2}AB$.
2. Set the compass at A and draw an arc through \overline{AB} .
3. Keep the same setting, put the compass at B and draw an arc that intersects the previous arc both above and below the given segment. Label these points C and D .
4. Use a straightedge to draw \overleftrightarrow{CD} .
5. \overleftrightarrow{CD} is the perpendicular bisector of \overline{AB} .



CONSTRUCTION #5: Given a point on a line, construct a line through the point, perpendicular to the given line.

Given point F on line l , construct a perpendicular at F .

1. Set the compass at F and draw two arcs on line l of equal distance on either side of F . Label these H and K .
2. Using a LARGER setting for the compass, put the compass at H and draw an arc above the line.
3. Using the same setting, put the compass at K and draw an arc that intersects the previous arc. Label this intersection point M .
4. Use a straightedge to draw \overleftrightarrow{MF} .
5. \overleftrightarrow{MF} is perpendicular to line l at F .



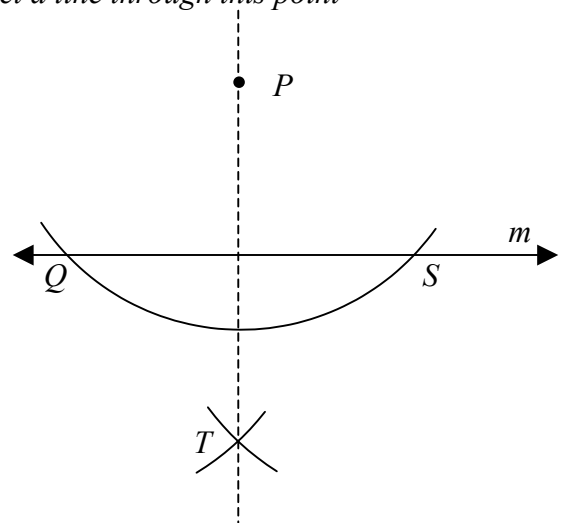
NOTE!! Construction #4 is applied when we need to find the midpoint of a segment.

NOTE!! Construction #5 is the same as problem #6 in Lesson 1. The bisector of a straight angle is a perpendicular line.

CONSTRUCTION #6: Given a point not on a line, construct a line through this point perpendicular to the given line.

Given line m and point P (not on line m), construct a line through P perpendicular to m .

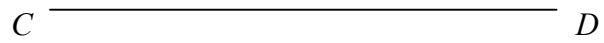
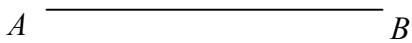
1. Set compass at P and draw any arc that intersects line m in two points. Label these Q and S .
2. Set compass at Q , draw an arc below the line.
3. Using the same setting, put compass at S and draw an arc that intersects the previous arc. Label this T .
4. \overleftrightarrow{PT} is perpendicular to line m .



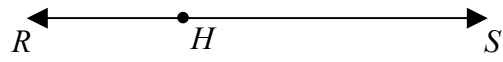
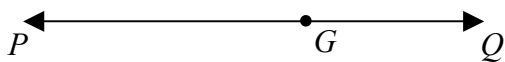
NOTE!!: Construction #6 is applied when we need to construct the altitude of a triangle. Point P would be the vertex angle and the line would be the base of the triangle (extended when needed).

ASSIGNMENT:

1. Construct the perpendicular bisector of \overline{AB} and \overline{CD} .



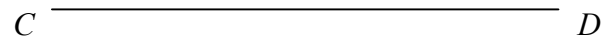
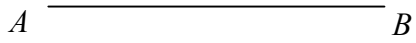
2. Construct a line through G and H perpendicular to \overleftrightarrow{PQ} and \overleftrightarrow{RS} .



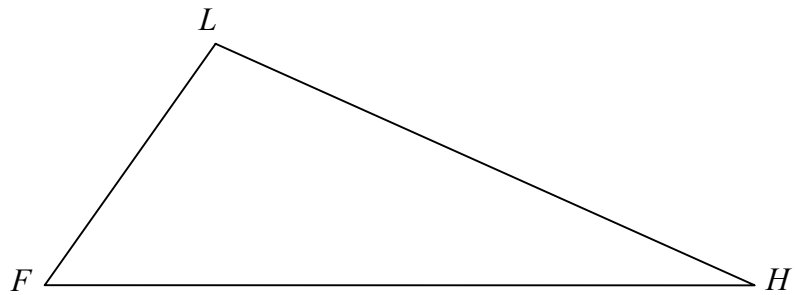
3. Construct a line through J and K perpendicular to \overline{AB} and \overline{CD} .

• J

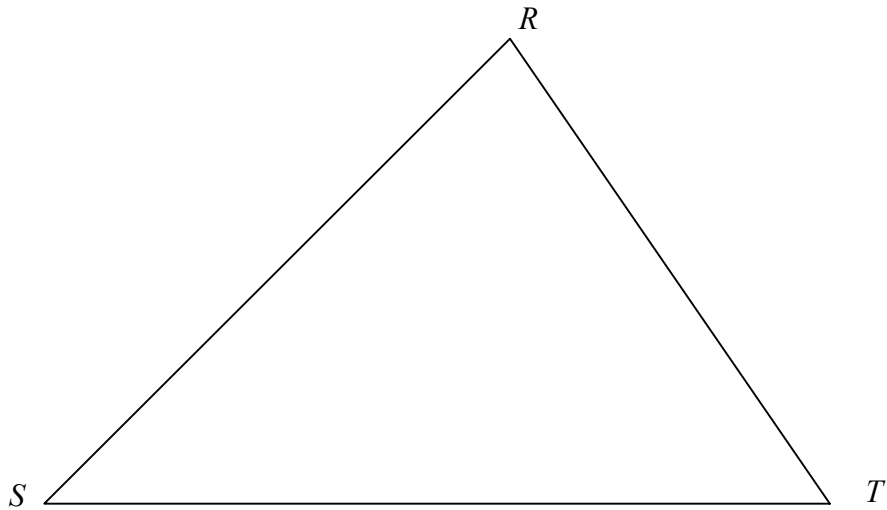
• K



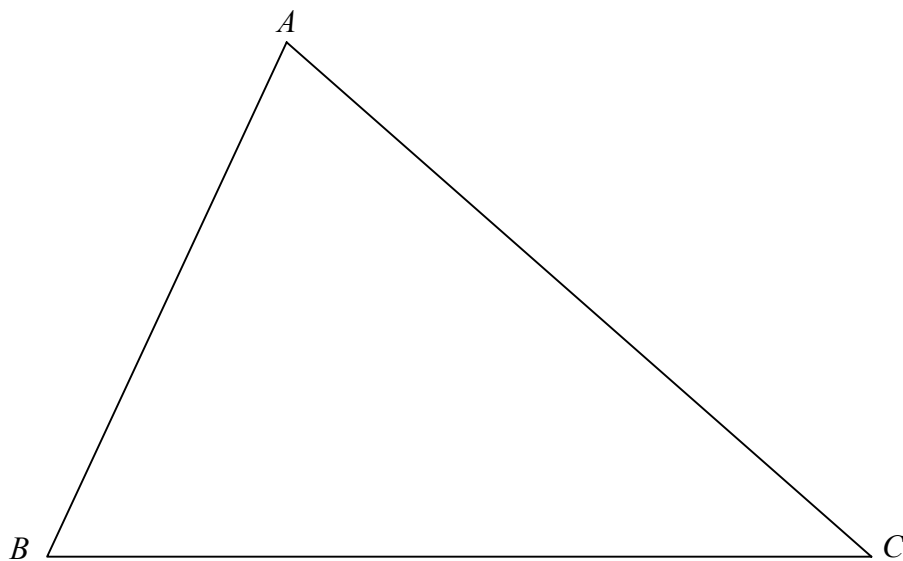
4. Determine the midpoint of \overline{FL} and \overline{HL} .



5. Construct the median from R to side \overline{ST} .



6. For $\triangle ABC$, construct the three altitudes to each side. What appears to be true?



7. Construct the \perp bisectors for each side. Extend until they cross. Measure the distance from this point to each vertex. What seems to be true?

