Geometric Construction Notes

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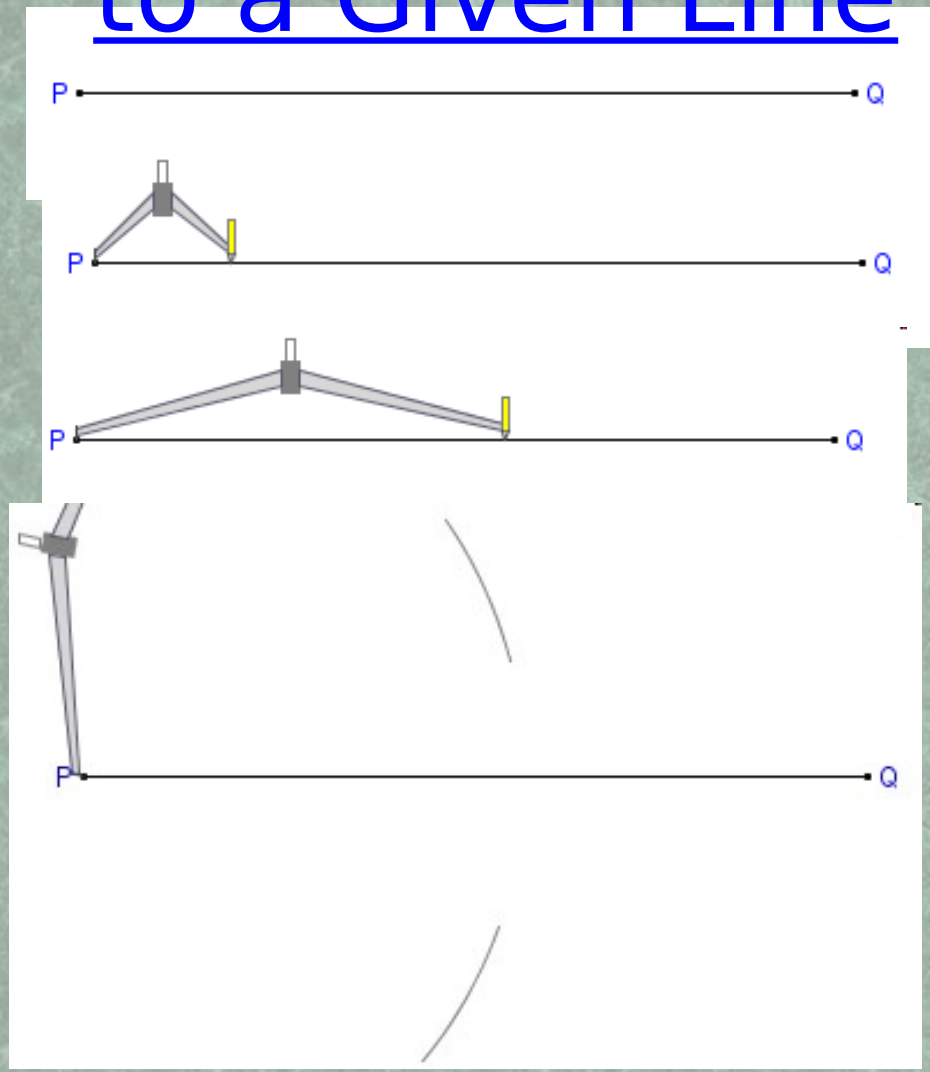
Geometric Construction Introduction

- Based on principles of pure geometry and may be applied to any shape regardless of the size.
- CAD is based on geometric construction so understanding geometric construction makes understanding how CAD tools work easier and increases proficiency.

Drawing Guidelines

- Draw constructions very lightly using guidelines.
- Do NOT erase your guidelines- show your work.
- Only trace over the final solution NOT the construction.

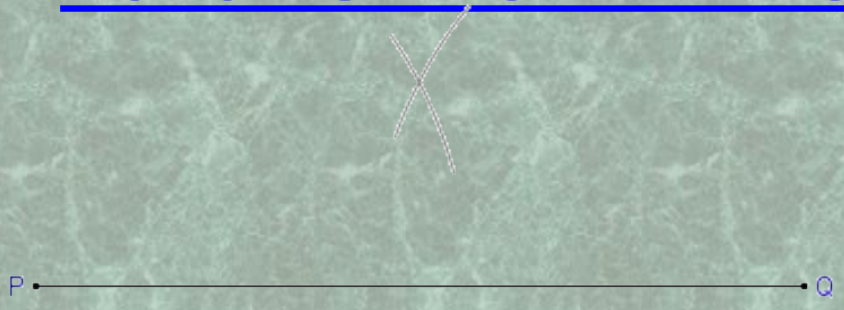
Draw a Perpendicular Bisector to a Given Line



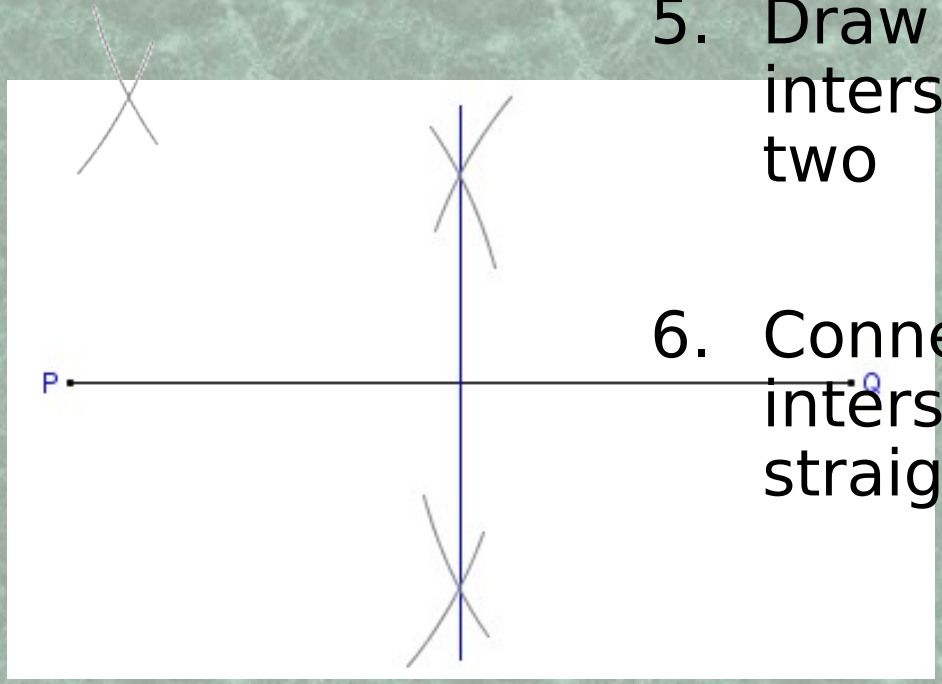
Begin with a given line

1. Place the compass point on one end point (ep) of the line.
2. Adjust the compass radius to approximately 2/3 the length of the line (radius must be > ½ the length of the line but actual size does not matter)
3. Draw an arc above and below the line.

Draw a Perpendicular Bisector to a Given Line

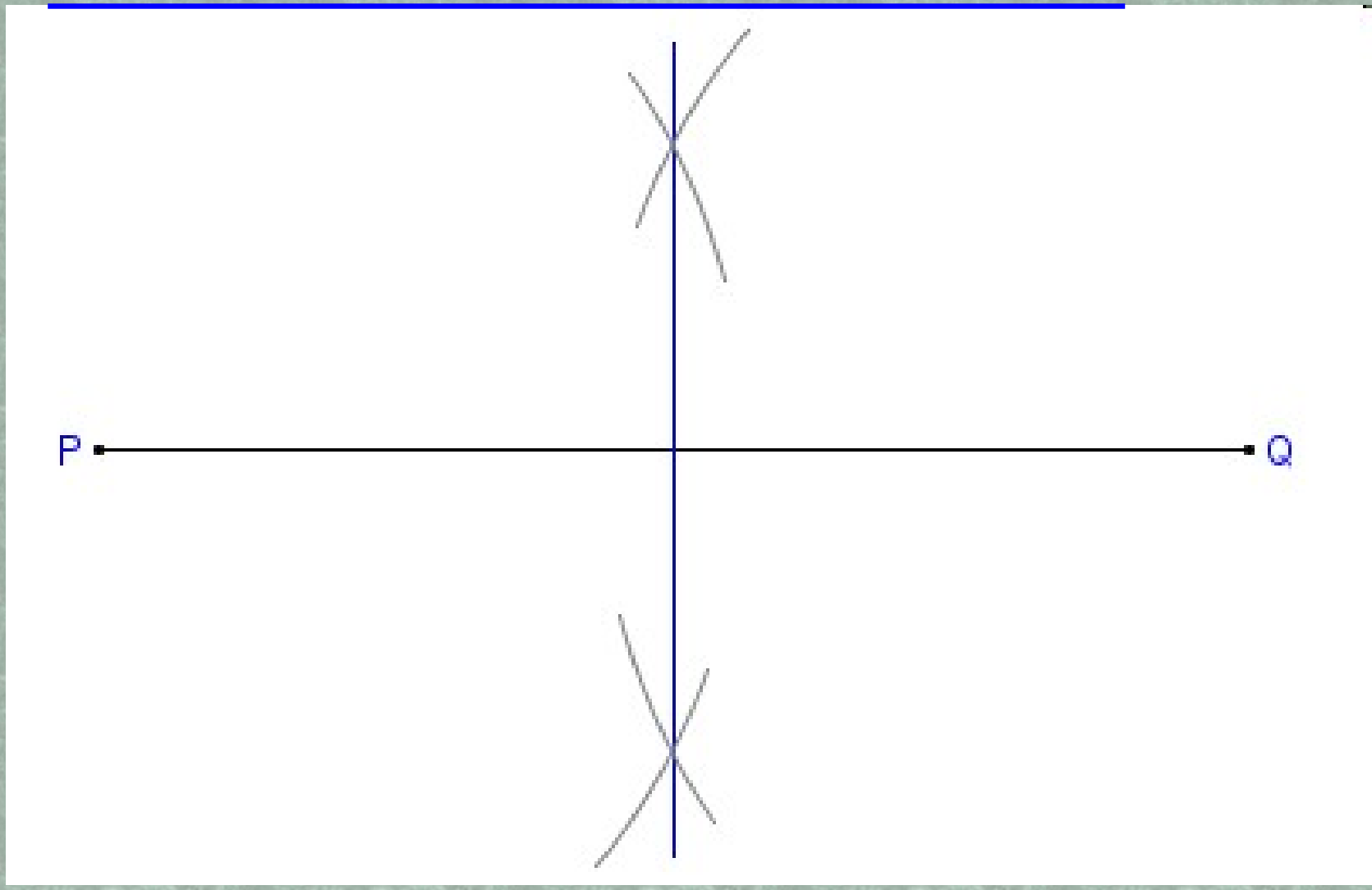


4. Without adjusting the radius place the compass point on the opposite ep of the line .
5. Draw arcs intersecting the first two

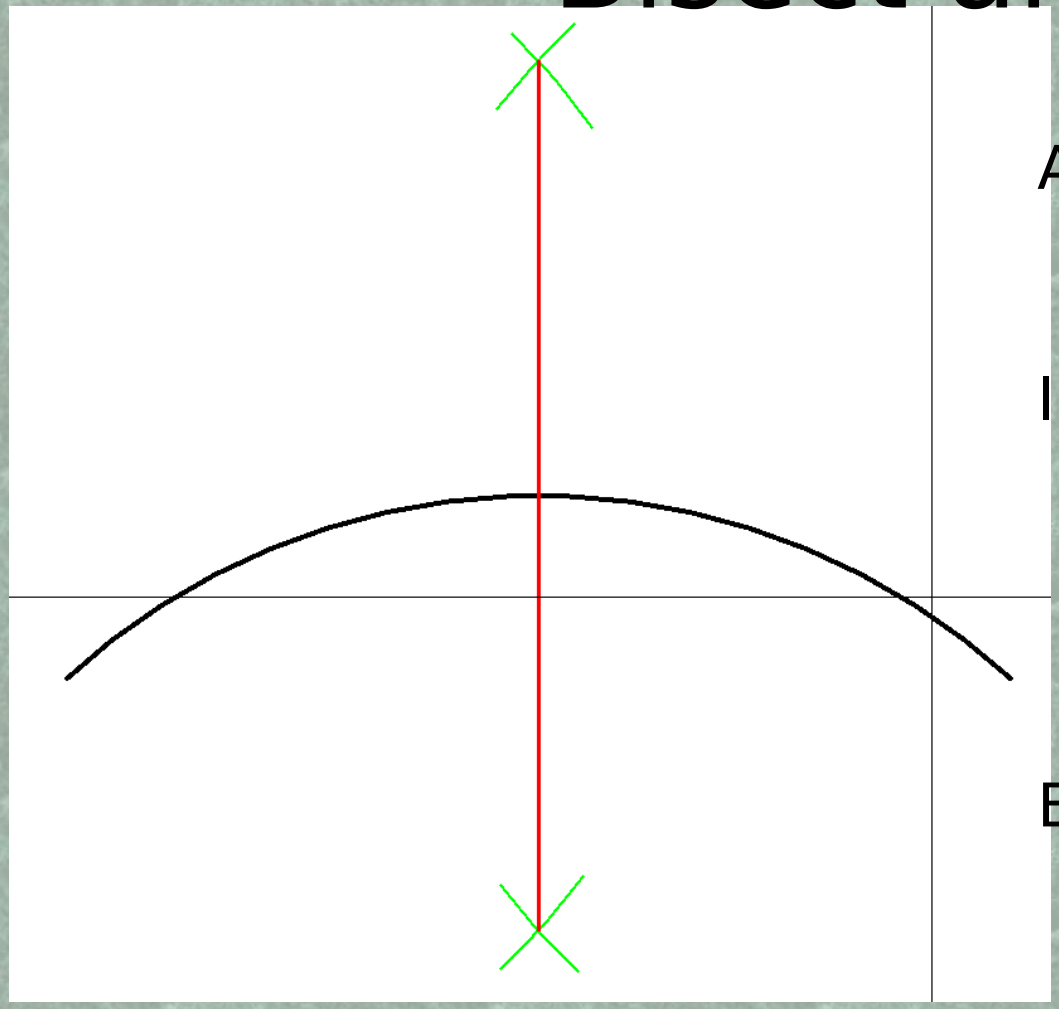


6. Connect the intersections using a straight edge.

Draw a Perpendicular Bisector to a Given Line- Solution



Bisect an Arc



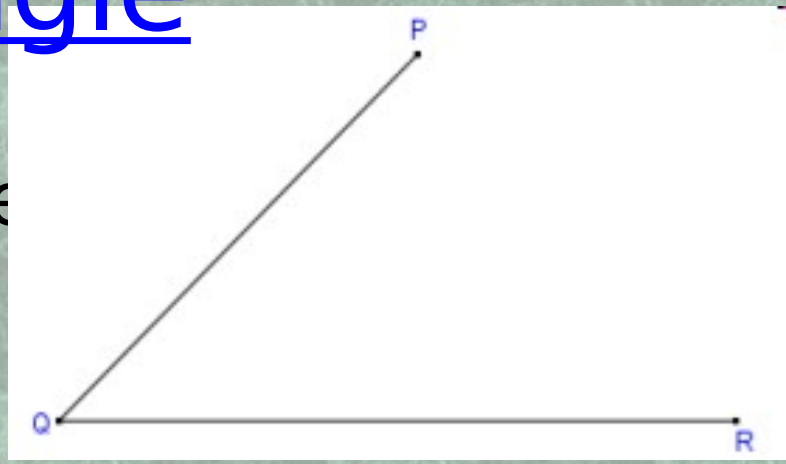
An arc is a curved line and is bisected using the same steps.

Imagine a line between the end points of the arc.

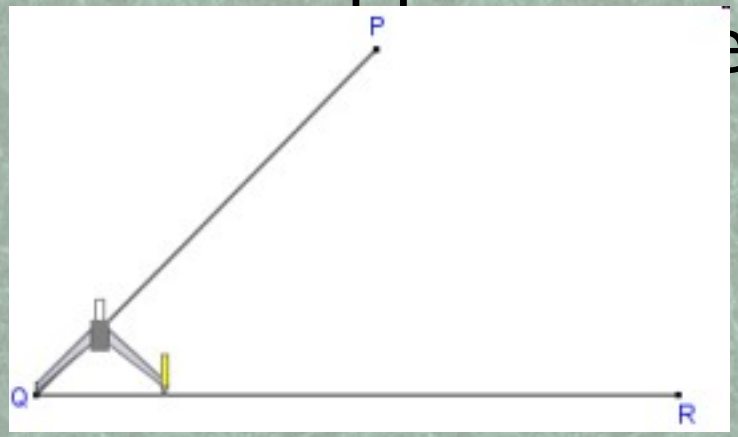
Bisect the imagined line as you did to complete the perpendicular bisect

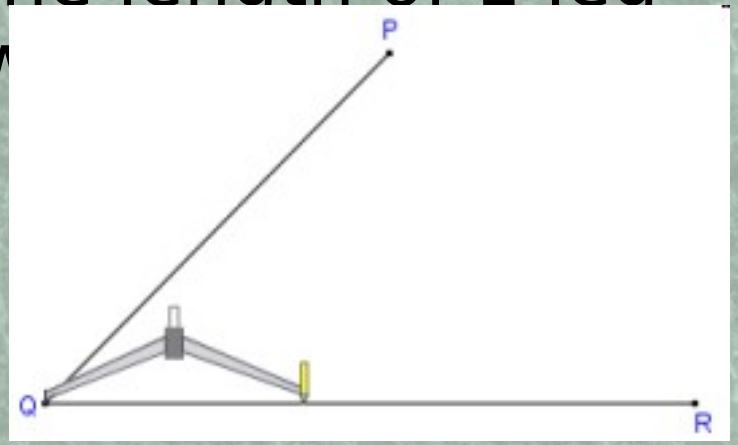
Bisect Angle

Begin with a given angle



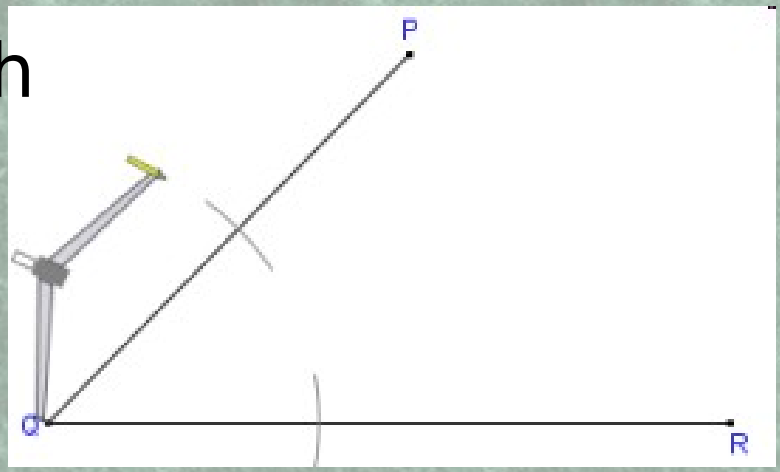
- Place the compass point on the Vertex (Q) and adjust to a width approximately half the length of 1 leg
e (exact w





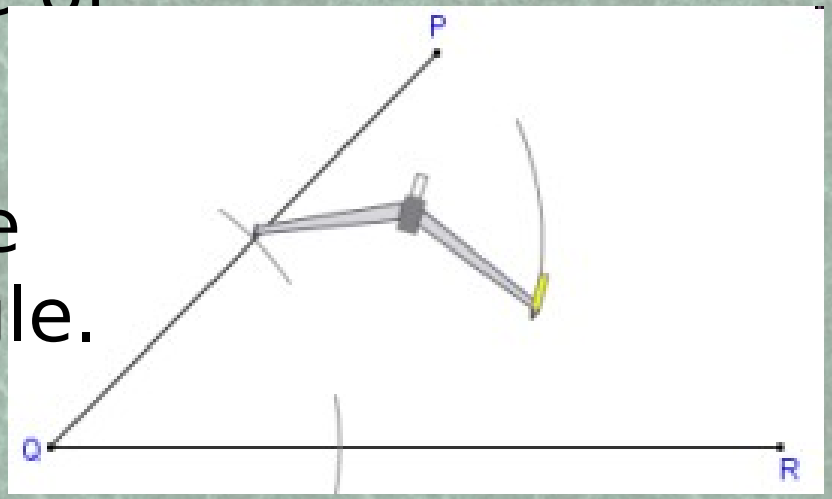
Bisect Angle

2. Draw an arc across each leg of the angle



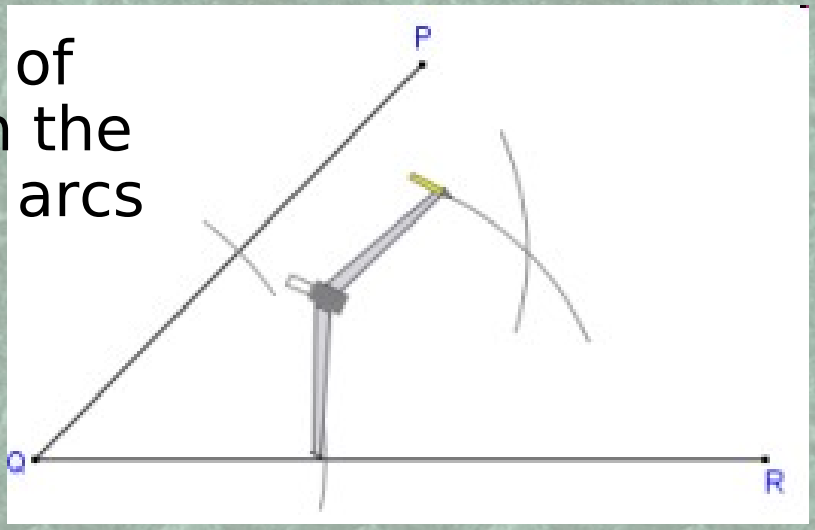
3. Move the compass point to the intersection of one of the legs and arc.

4. Draw an arc in the interior of the angle.

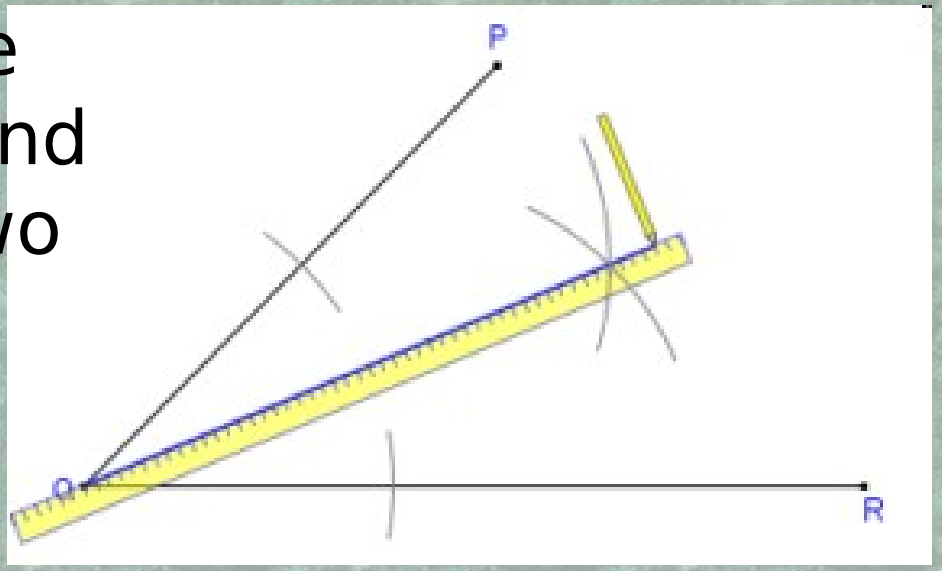


Bisect Angle

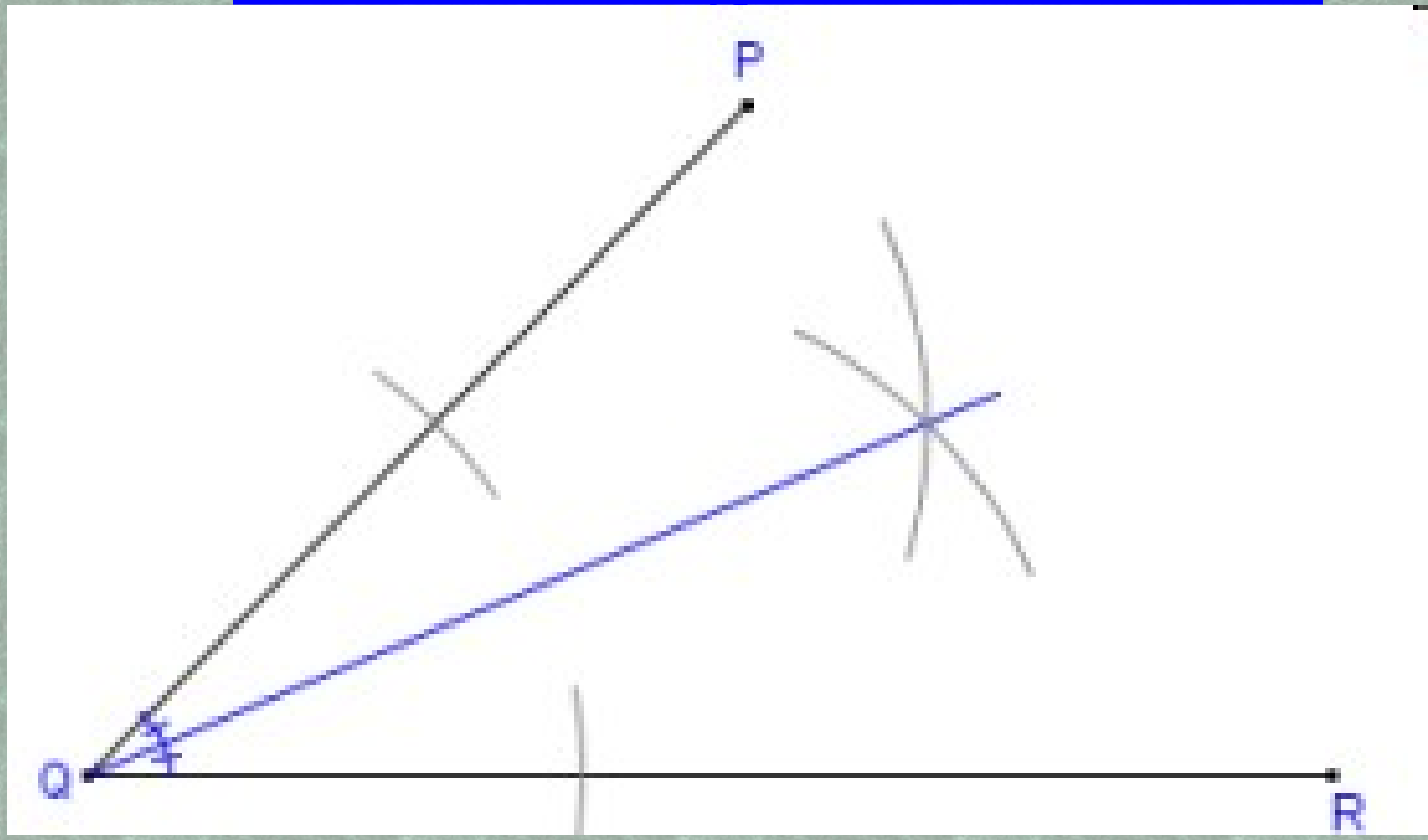
5. Without changing the radius of the compass do the same on the other leg of the angle so the arcs intersect



6. Using a straight edge connect the vertex and intersection of the two arcs.

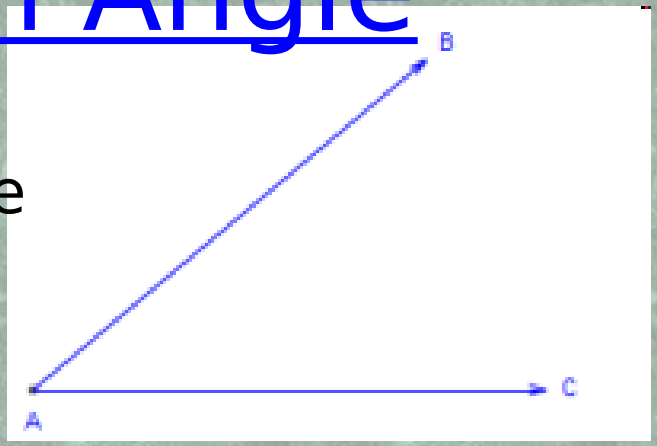


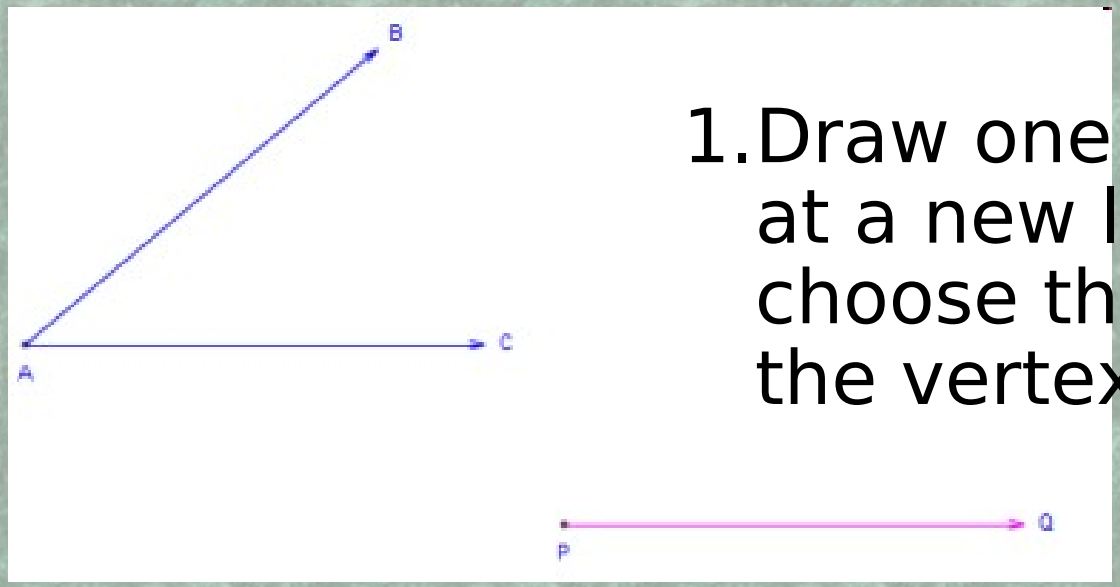
Bisect Angle- Solution



Transfer an Angle

Begin with a given angle

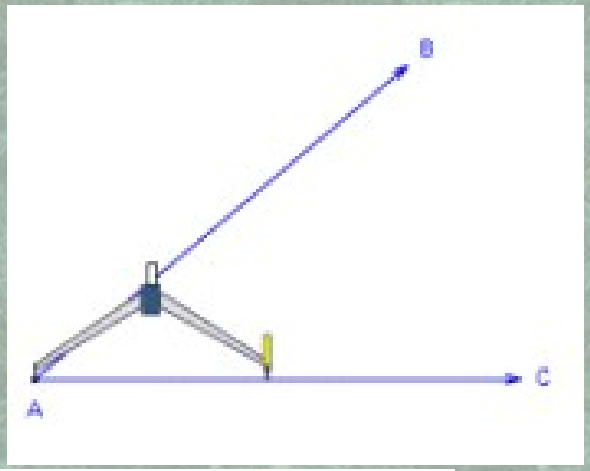




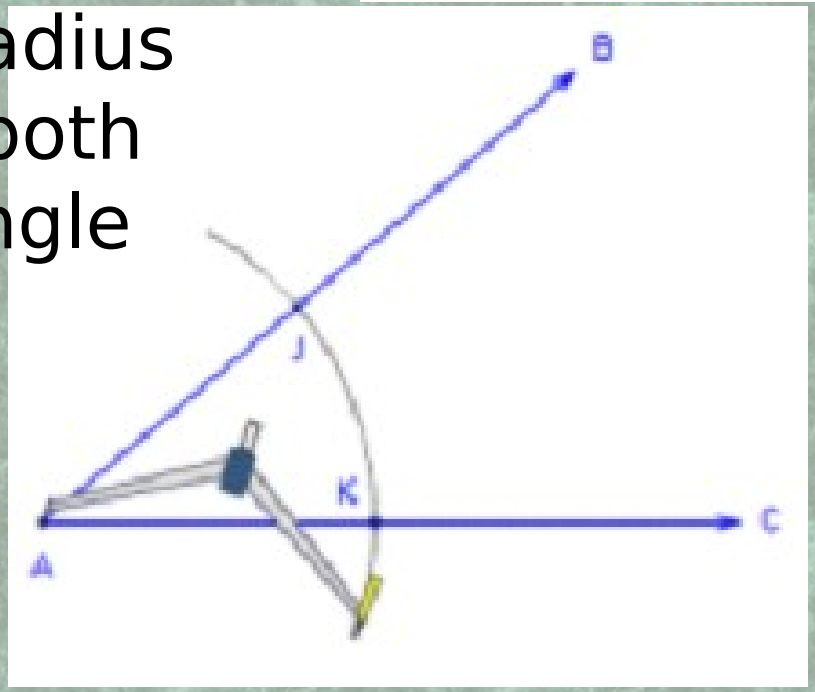
1. Draw one leg of the angle at a new location and choose the ep to use as the vertex

Transfer an Angle

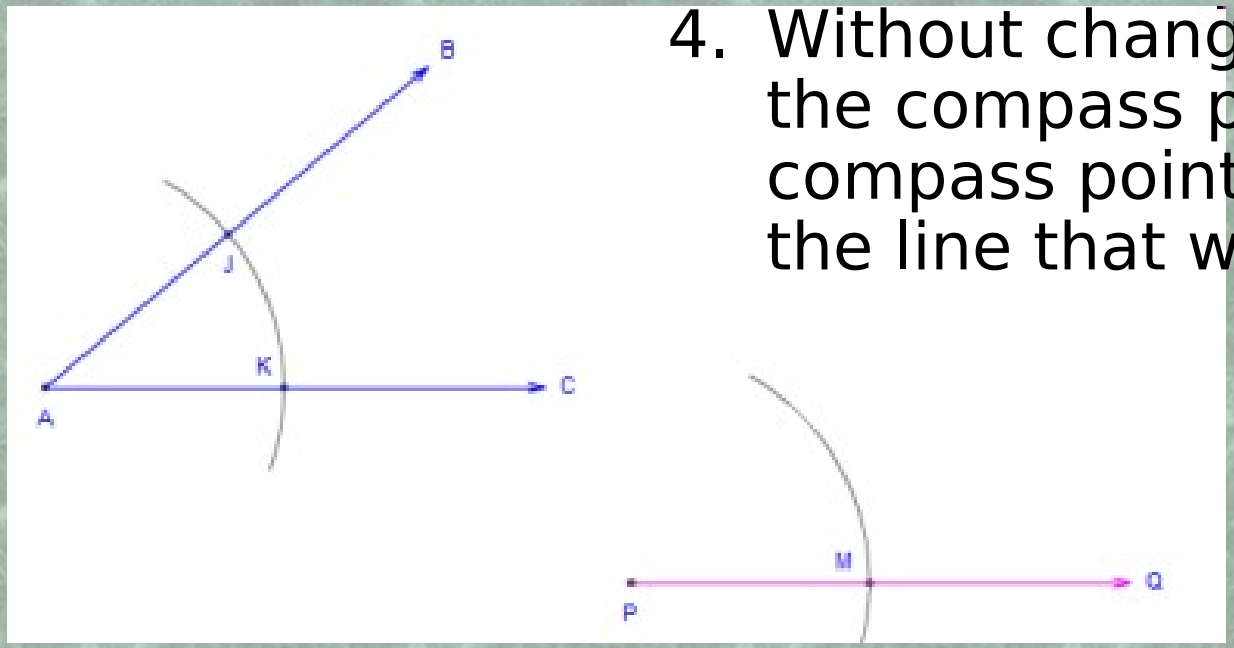
2. Place the compass point on the vertex of the angle



3. Draw an arc at any convenient radius intersecting both legs of the angle



Transfer an Angle



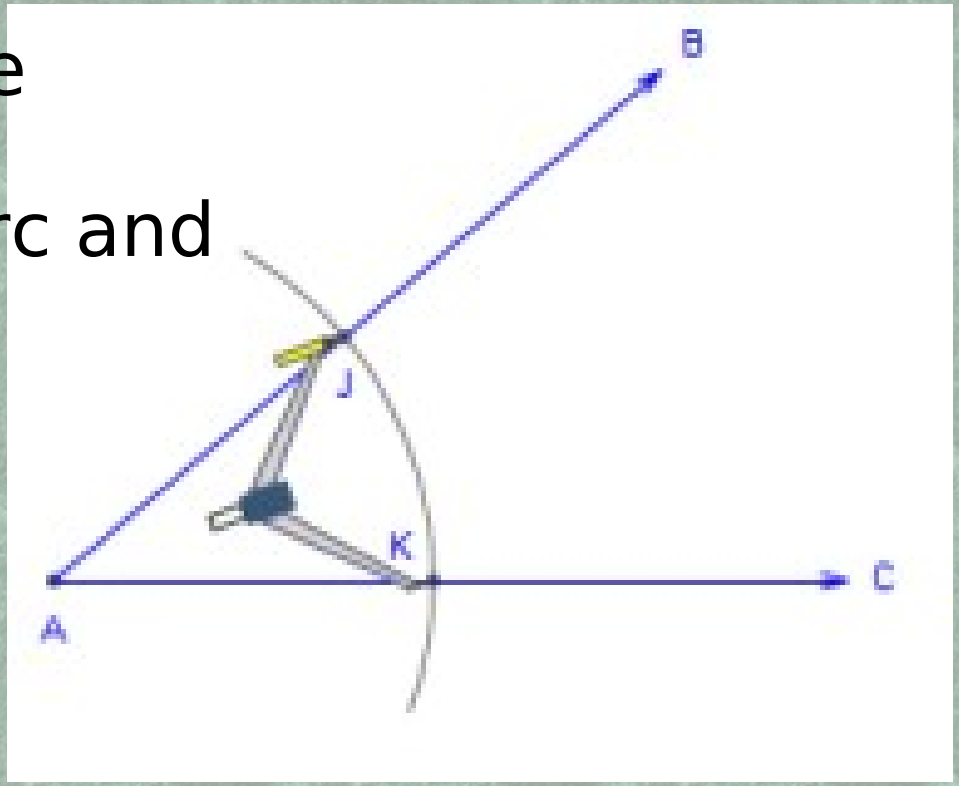
4. Without changing the width of the compass place the compass point on the ep of the line that will be the vertex

5. Draw a similar arc intersecting the line and extending above or below.

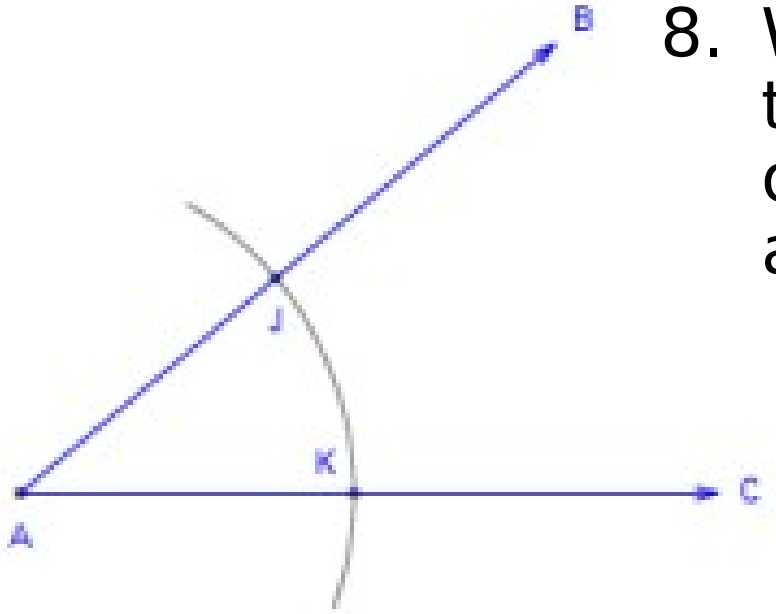
Transfer an Angle

6. Place the point of the compass on the intersection of the arc and one of the legs

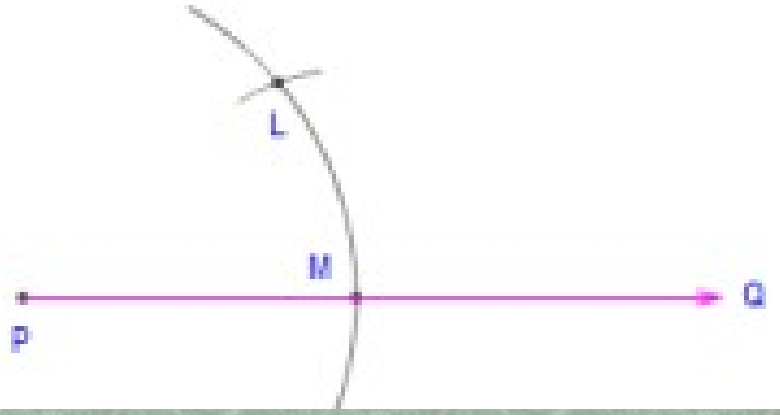
7. Adjust the compass so the lead is on the other intersection of the arc and opposite leg .



Transfer an Angle

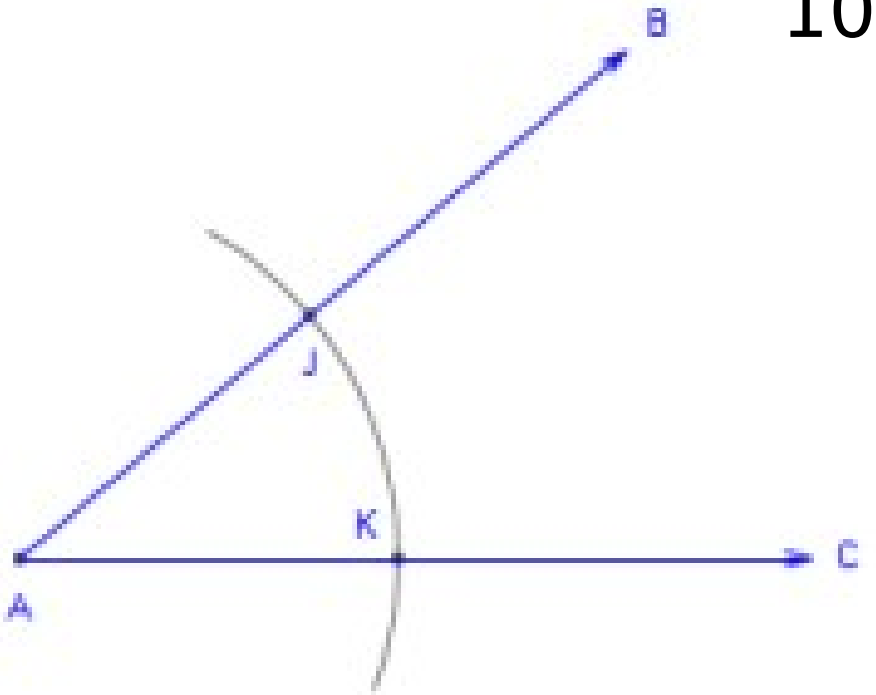


8. Without changing the radius of the compass place the point on the intersection of the arc and line at the new location

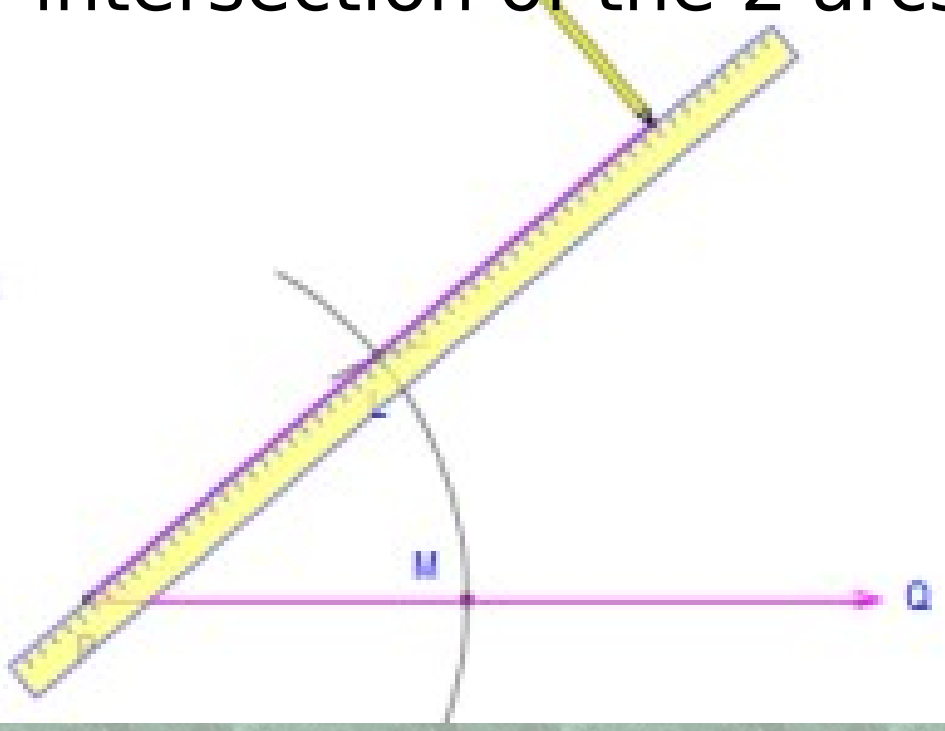


9. Draw an arc that intersects the other arc

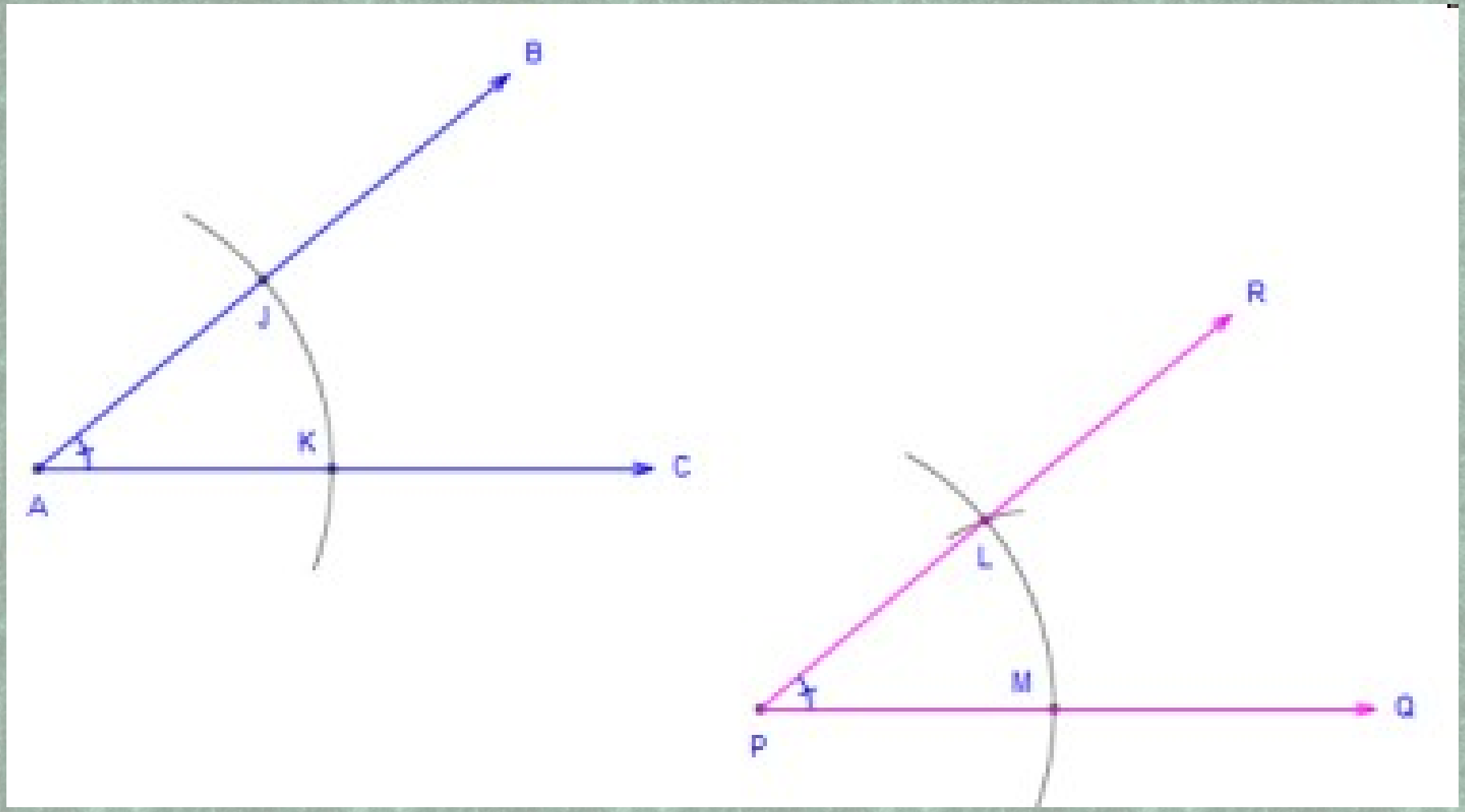
Transfer an Angle



10. Use a straightedge to draw a line from the vertex through the intersection of the 2 arcs

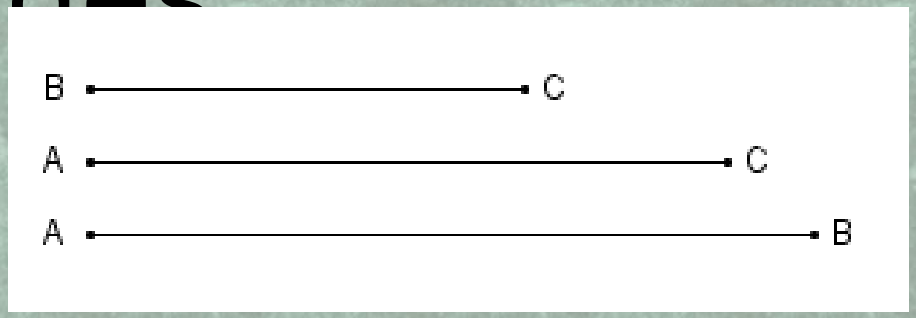


Transfer an Angle-Solution

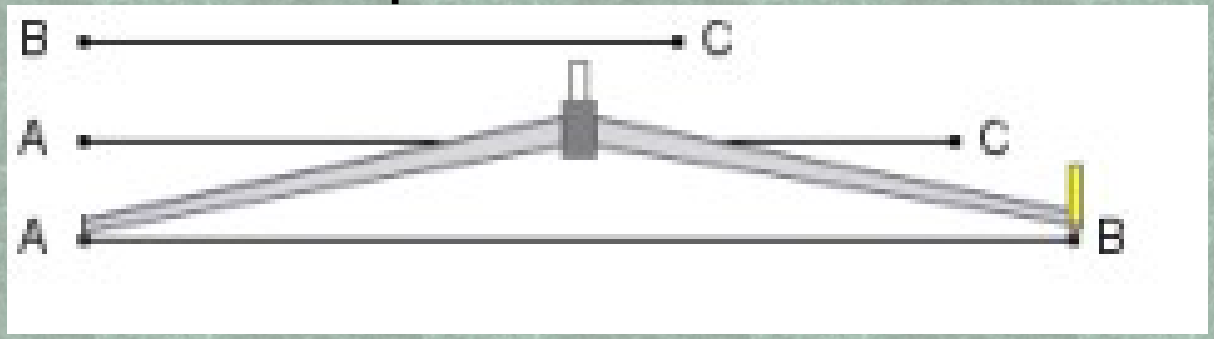


Construct a Triangle Given 3 Sides

Begin with the 3 given sides

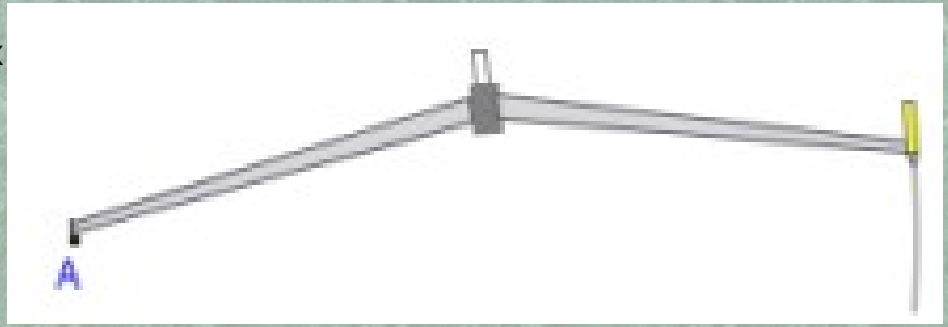


1. Draw a point that will be 1 vertex of the triangle.
2. Measure one of the sides with your compass. You will use this as the base



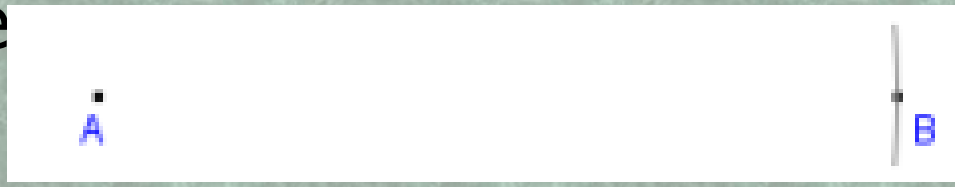
Construct a Triangle Given 3 Sides

3. Without changing the radius of the compass place the point of the compass on the vertex point. Draw an arc to the side of the point.



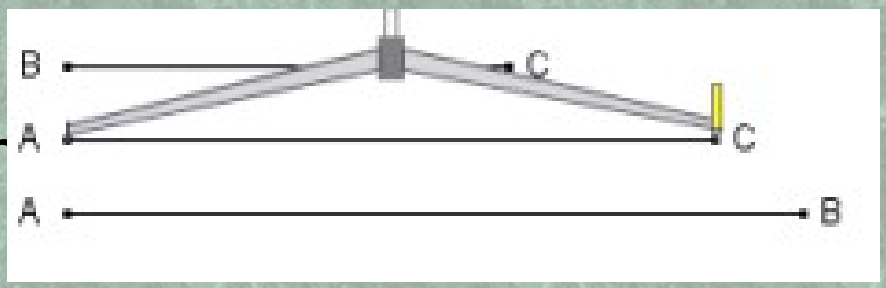
4. Draw an arc to the side of the point.

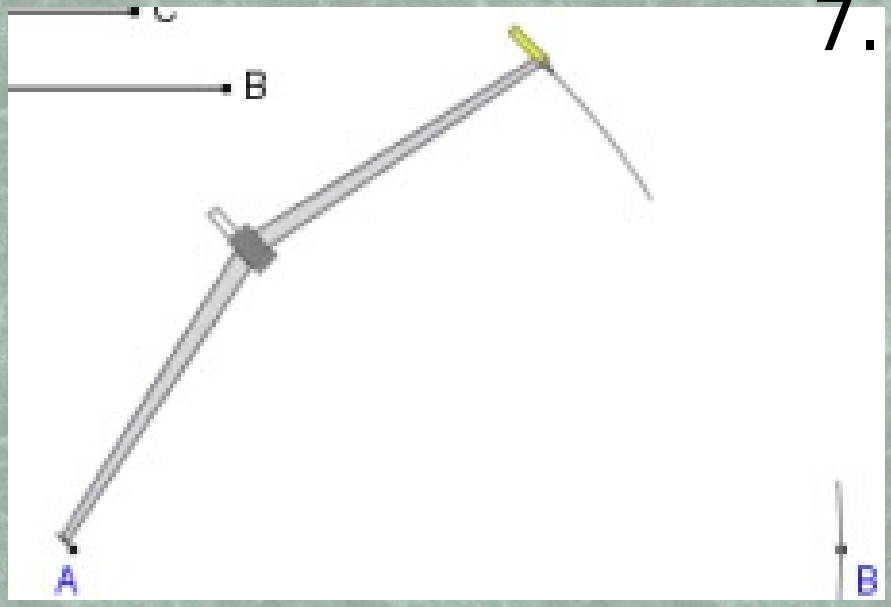
5. Make a point on the arc. This will be the second vertex of the triangle



Construct a Triangle Given 3 Sides

6. Using the Compass measure the length of one of the other given sides

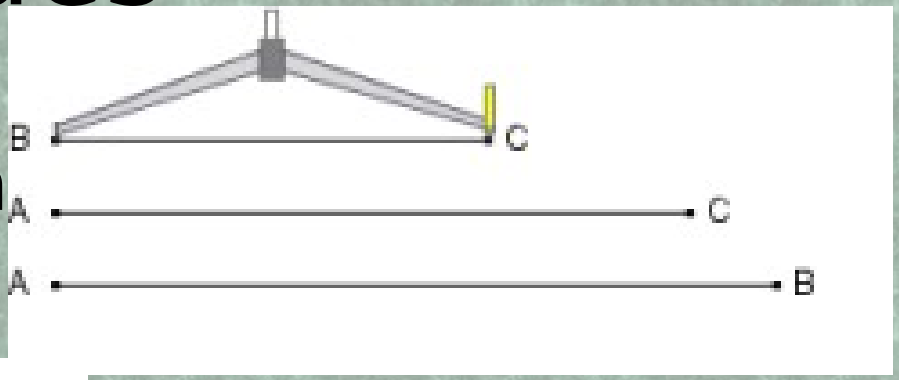


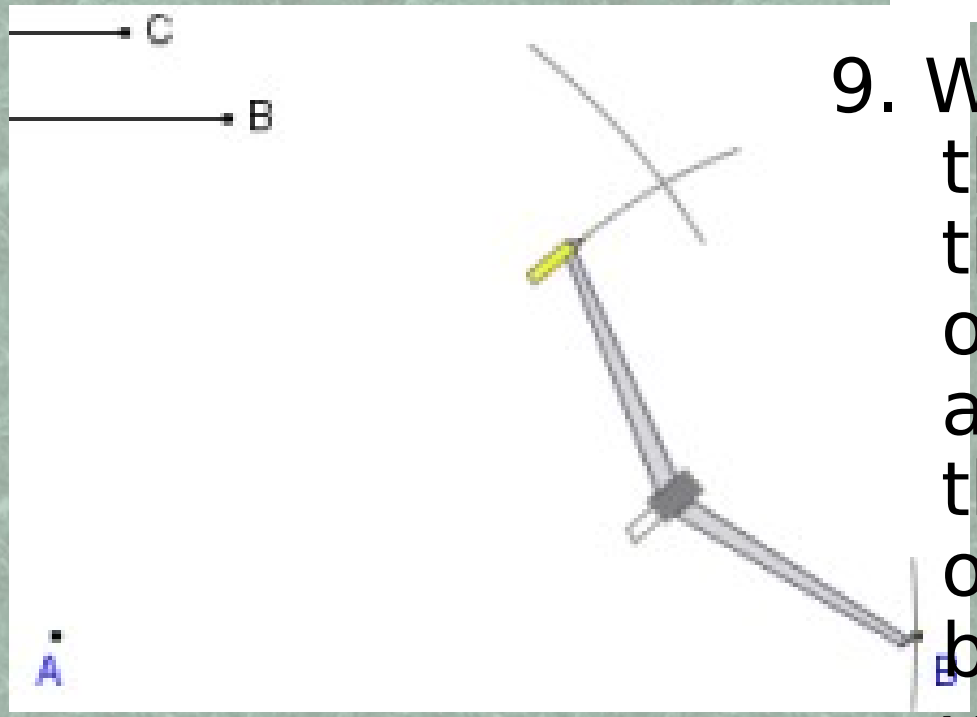


7. Without changing the radius. Place the compass point on one of the two vertices and draw an arc above or below the base.

Construct a Triangle Given 3 Sides

8. Using the Compass measure the length of the last side

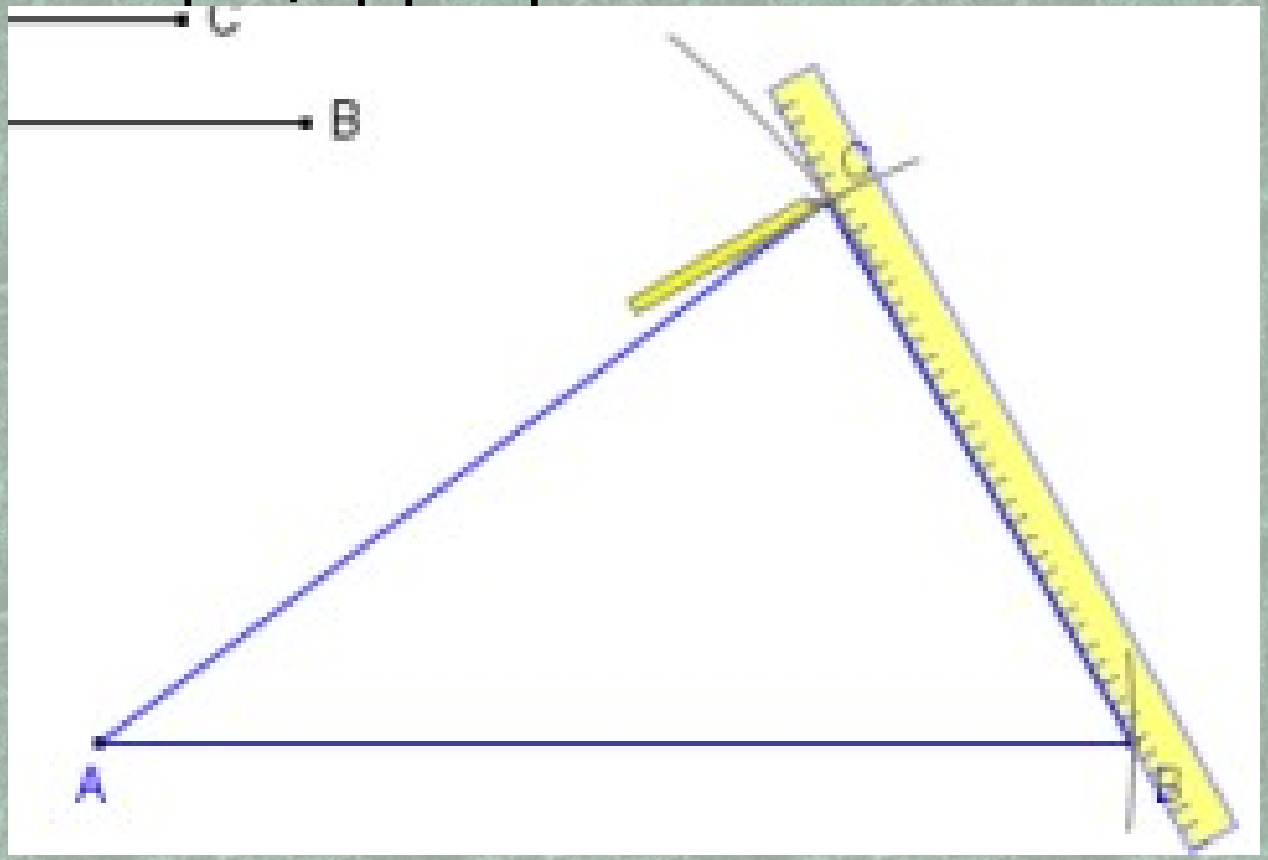




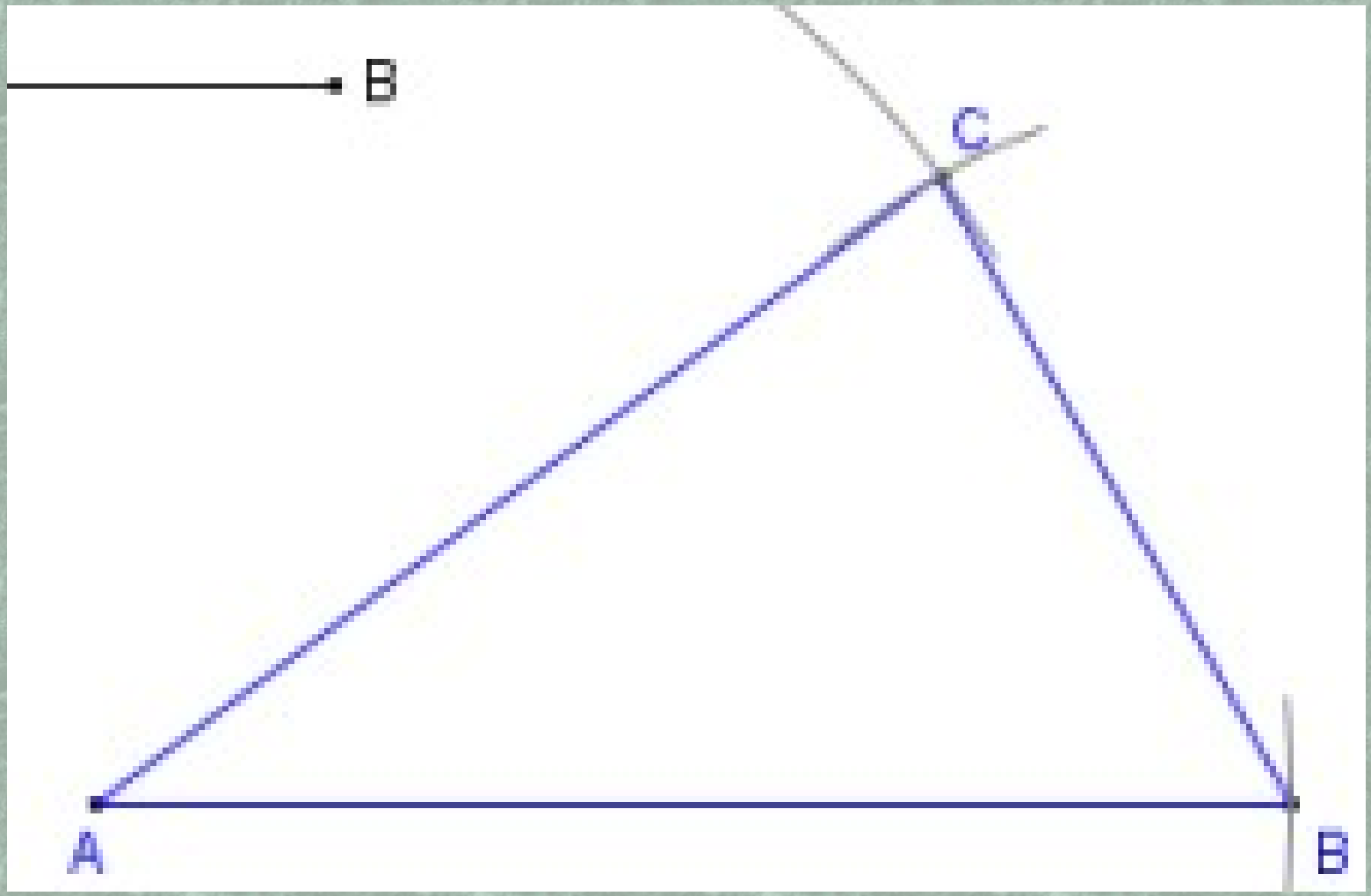
9. Without changing the radius. Place the compass point on the other vertex and draw an arc that intersects the other arc.- This becomes the 3rd vertex.

Construct a Triangle Given 3 Sides

10. Connect the 3 vertices using a

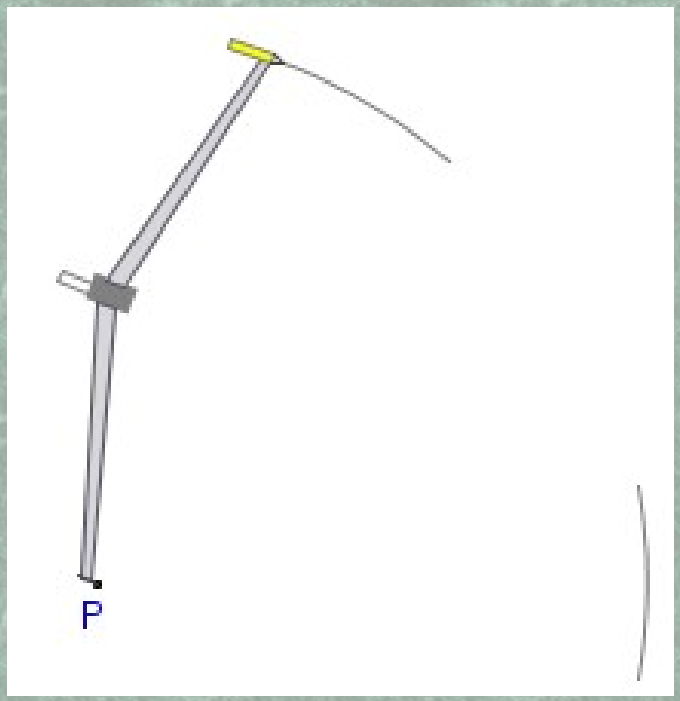


Construct a Triangle Given 3 Sides- Solution



Construct an Equilateral Triangle Given 1 Side

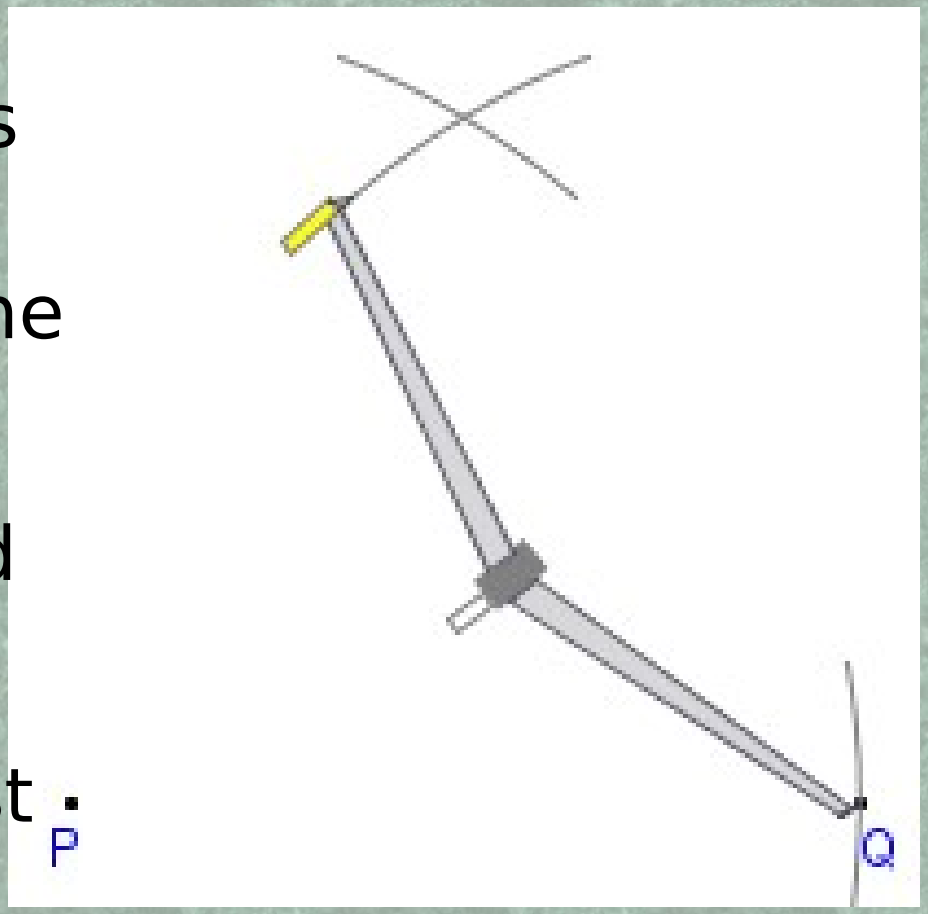
1. Begin by Making a point- This will be the first vertex
2. Using the compass measure the length of the given side and set the compass point on your first vertex.



3. Draw arcs to the side of the first vertex where you want the 2nd vertex and an arc above or below to locate the 3rd vertex

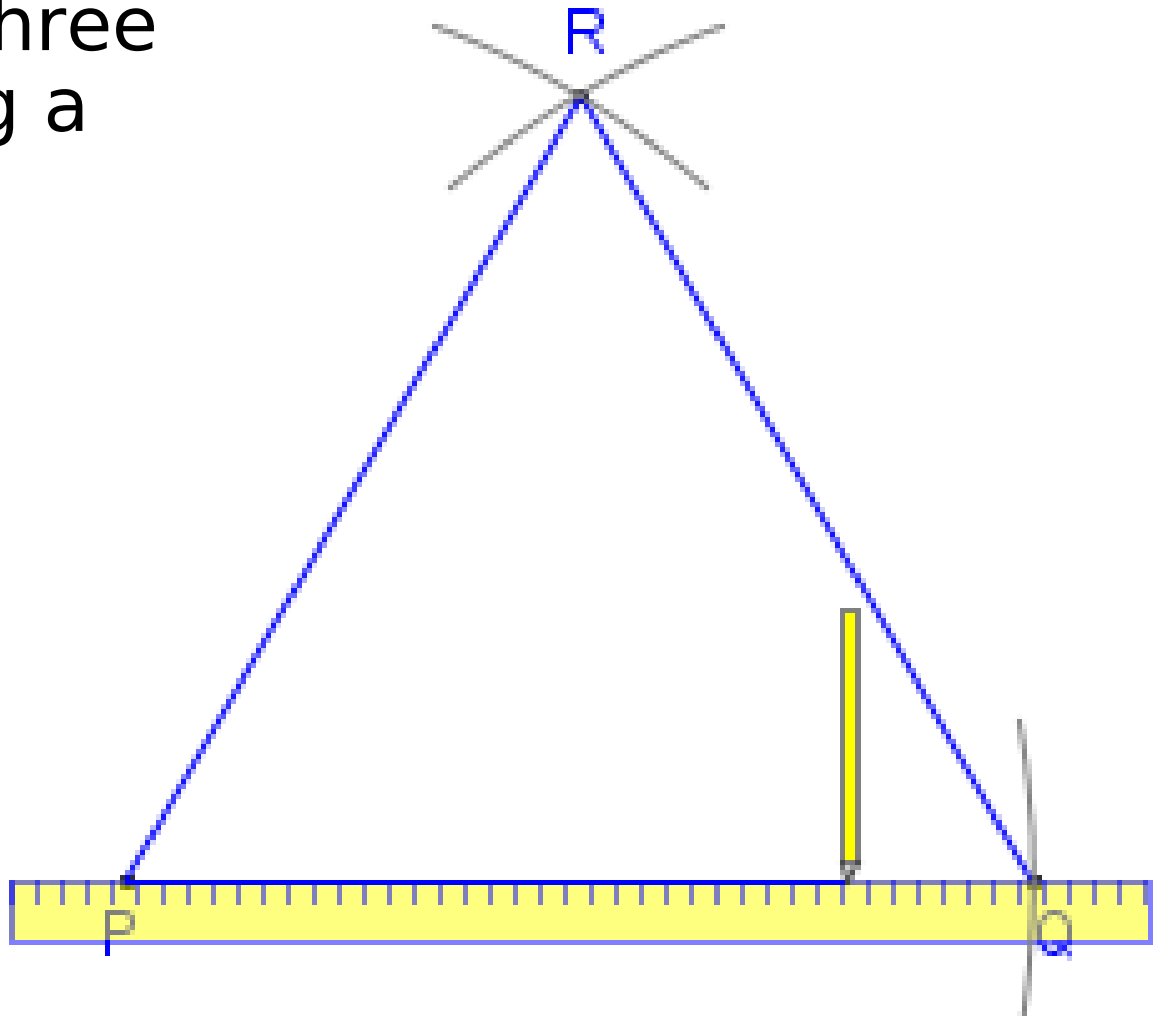
Construct an Equilateral Triangle Given 1 Side

4. Place a point on one of the two arcs- This will be the second vertex.
5. Without adjusting the radius of the compass place the point on the second vertex point and draw an arc intersecting the first arc.



Construct an Equilateral Triangle Given 1 Side

4. Connect the three vertices using a straight edge



Construct an Equilateral Triangle Given 1 Side- Solution

