Points of Concurrency Using GeoGebra

Sharing a didactic approach

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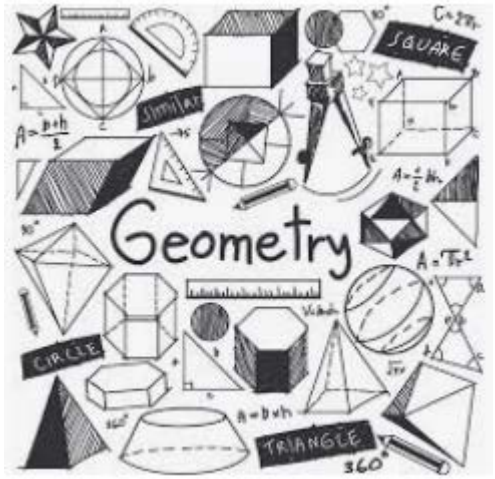
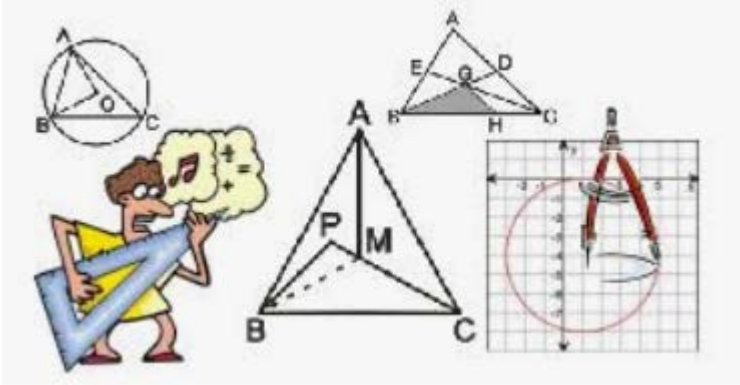
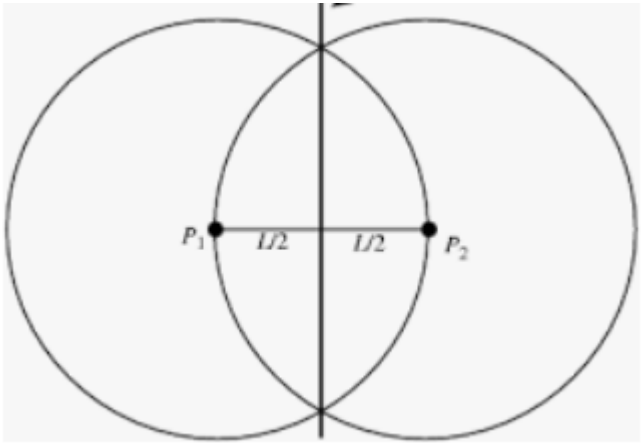


Didactic approach

- Exploration (geometric tools, technology)
- Conjecture
- Prove
- Application



Perpendicular Bisector



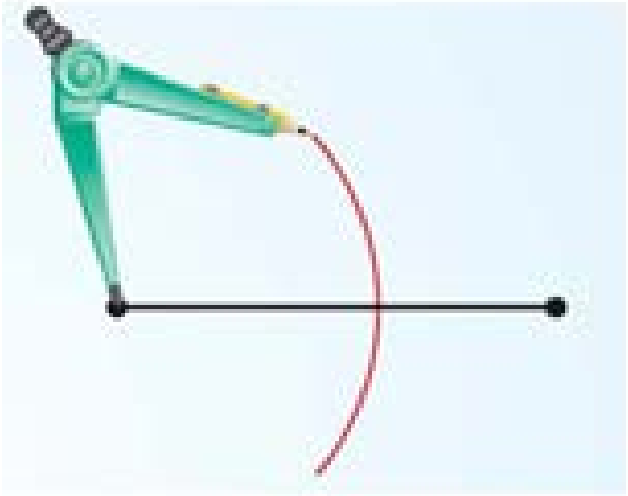
- Exploration

  a. Using ruler and compass.

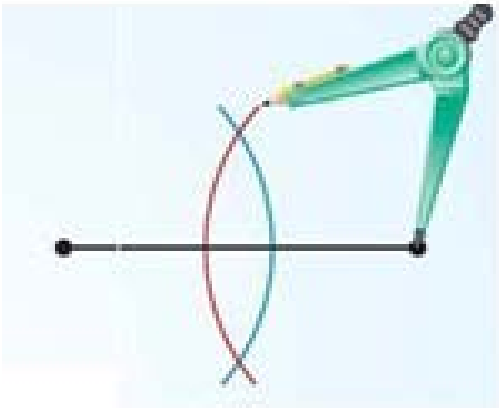
Construct the perpendicular bisector of the segment AB. Verify the properties of the perpendicular bisector. Select some points on the perpendicular bisector and find the distances to the endpoints of the segment. Write a conjecture based on your observations.

Construction of the Perpendicular Bisector of a segment using ruler and compass

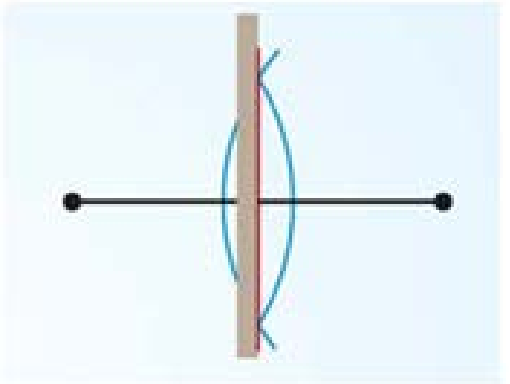
Draw an arc. Place the compass at *A*. Use a compass setting that is greater than half the length of segment *AB*. Draw an arc.



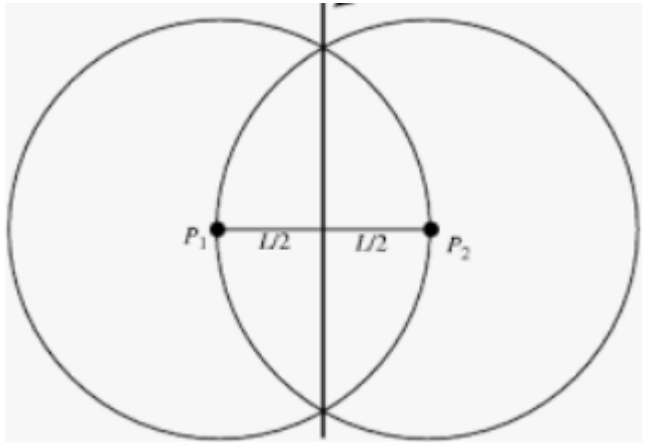
Draw a second arc. Keep the same compass setting. Place the compass at *B*. Draw an arc. It should intersect the other arc at two points.



Bisect segment. Draw a segment through the two points of intersection. This segment bisects segment *AB* at *M*, the midpoint of segment *AB*.



Perpendicular Bisector



- Exploration

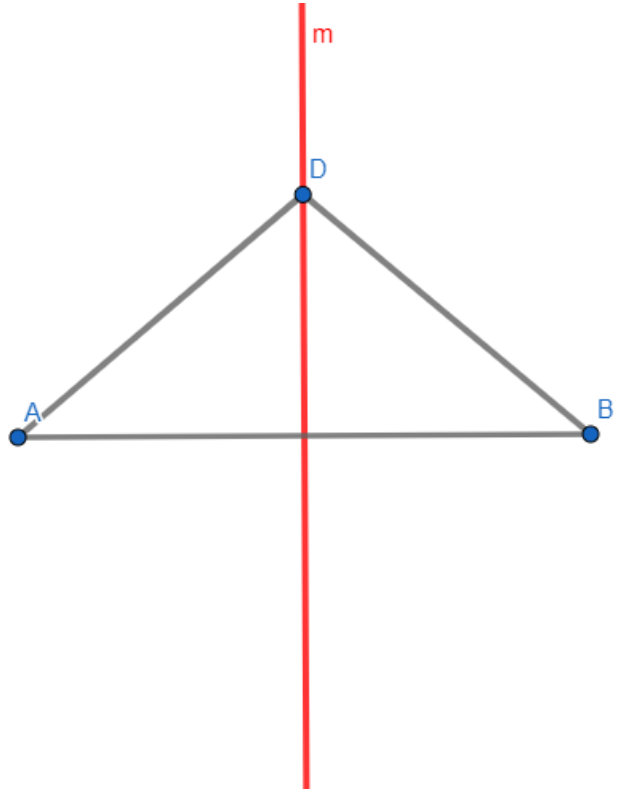
  b. Using GeoGebra.

  Geogebra Constructions\Perpendicular Bisector - Jimena Diaz.webm

Perpendicular Bisector

- Conjecture

Any point on the perpendicular bisector of a segment is equidistant to the endpoints of the segment.



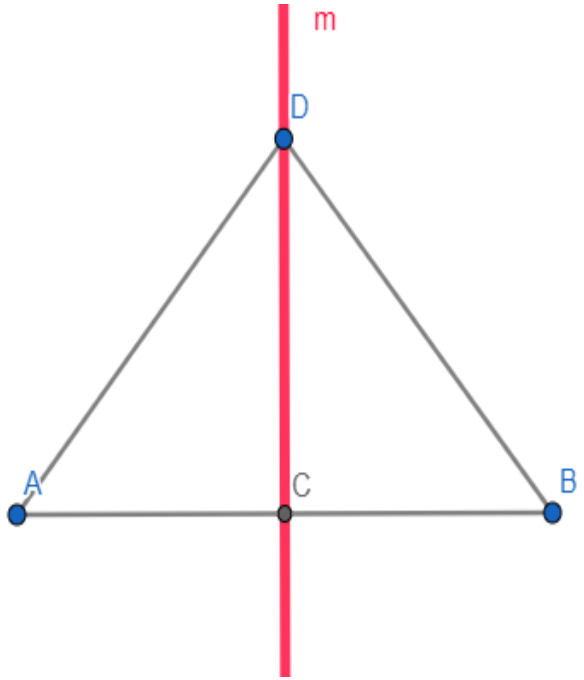
Perpendicular Bisector

- Prove

Given: line m is the perpendicular bisector of $\overline{AB}$.

Point D lies on line m

Prove: $\overline{AD} \cong \overline{BD}$

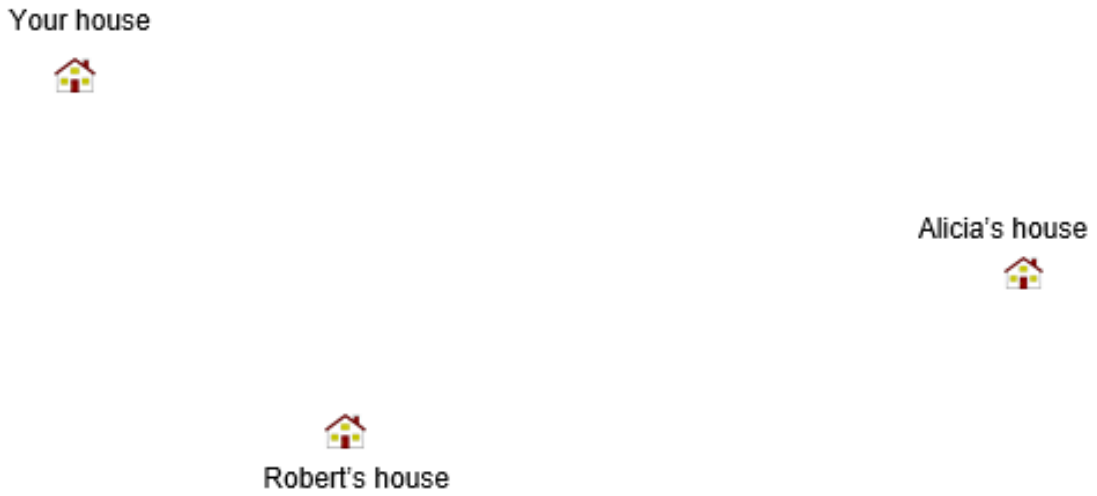


STATEMENTS	REASONS
Line m perpendicular bisector of $\overline{AB}$	Given
$m < DCA = 90°$ $m < DCB = 90°$	Def. Perpendicular Bisector
$< DCA \cong < DCB$	Def. Congruence
C is the midpoint of $\overline{AB}$	Def. Perpendicular Bisector
$\overline{AC} \cong \overline{BC}$	Def. Midpoint
$\overline{DC} \cong \overline{DC}$	Congruence Reflexive Property
$\Delta ADC \cong \Delta BDC$	SAS Congruence Theorem
$\overline{AD} \cong \overline{BD}$	Corresponding sides on congruent triangles

Perpendicular Bisector

- Application

You and two friends Alicia and Robert want to meet, and you want the meeting place to be the same distance from each person's house. Explain how you can locate the meeting place.



Geogebra Constructions\Application Perpendicular Bisector - Ernesto Avila.webm

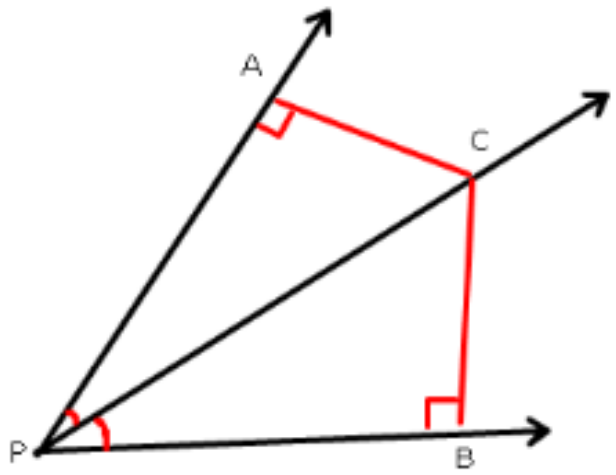
Angle Bisector

- Prove

Given: $\overrightarrow{PC}$ is the angle bisector of $< APB$.

$m < CAP = 90°,\ m < CBP = 90°$

Prove: $\overline{AC} \cong \overline{BC}$



STATEMENTS	REASONS
$\overrightarrow{PC}$ is the angle bisector of $< APB$	Given
$< APC \cong < CPB$	Def. Angle Bisector
$m < CAP = 90°\ , m < CBP = 90°$	Given
$< CAP \cong < CBP$	Def. Congruence
$\overline{PC} \cong \overline{PC}$	Congruence Reflexive Property
$\Delta APC \cong \Delta BPC$	AAS Congruence Theorem
$\overline{AC} \cong \overline{BC}$	Corresponding sides on congruent triangles

Points of Concurrency

Incenter - Angle Bisectors

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Circumcenter – Perpendicular Bisectors

Geogebra Constructions\CIrcumcenter - Jason Miranda.webm

Points of Concurrency

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