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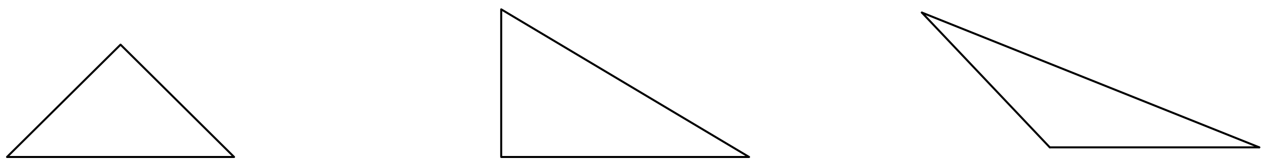
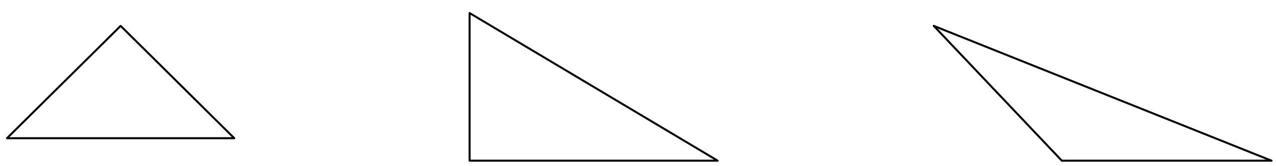
4.7 MEDIANS, ALTITUDES, PERPENDICULAR BISECTORS SKETCHPAD

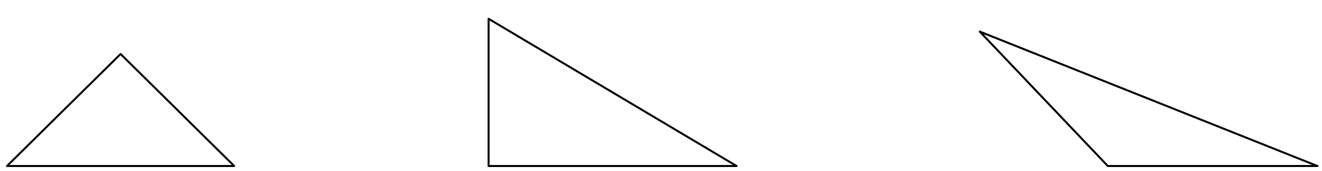
DEF: A **MEDIAN** of a triangle is a segment from a vertex to the midpoint of the opposite side.



DEF: An **ALTITUDE** of a triangle is the perpendicular segment **from a vertex** to the line that contains the opposite side.



DEF: A **PERPENDICULAR BISECTOR** of a segment is **a line** (or ray or segment) that is perpendicular to the segment at its midpoint.



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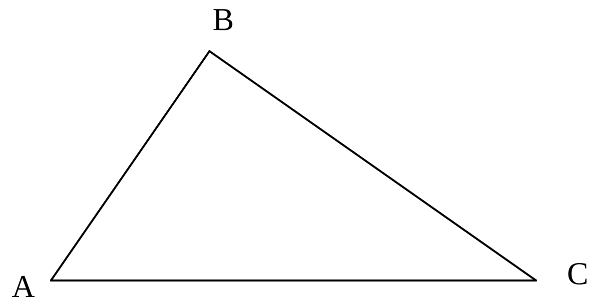
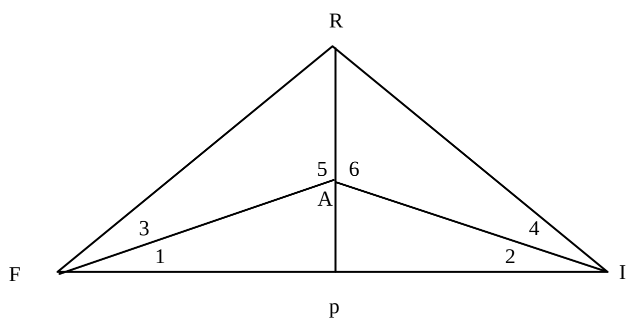
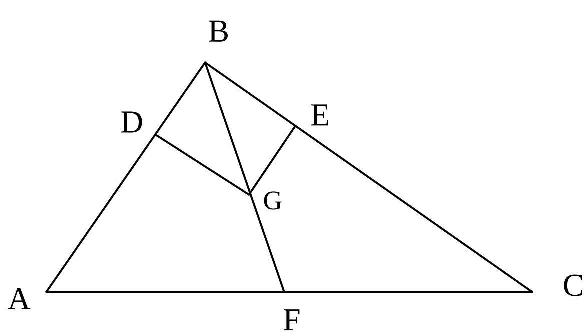
Given triangle ABC, draw a perpendicular bisector to AC. Connect any point on the perpendicular bisector to the endpoints of AC. What do you know?



We know that it takes 2 points to determine a line. Given midpoint on FI and AI = AF. What can you show is true? Would the same things be true if you had RF = RI and AF = AI?



If BF bisects <ABC and $\overline{GD} \perp \overline{AB}$, $\overline{GE} \perp \overline{BC}$, what can you find?



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TH 4-5: If a point lies on the perpendicular bisector of a segment,

then____

TH: 4-6: If a point is equidistant from the endpoints of a segment,

then ____:

TH 4-7: If a point lies on the bisector of an angle,

then ____

TH 4-8: If a point is equidistant from the sides of an angle,

then____

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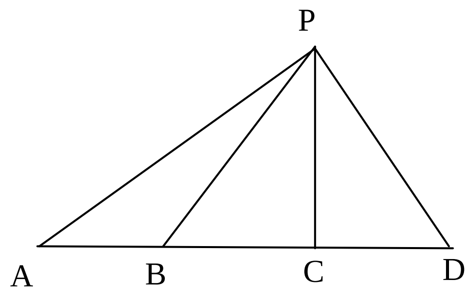
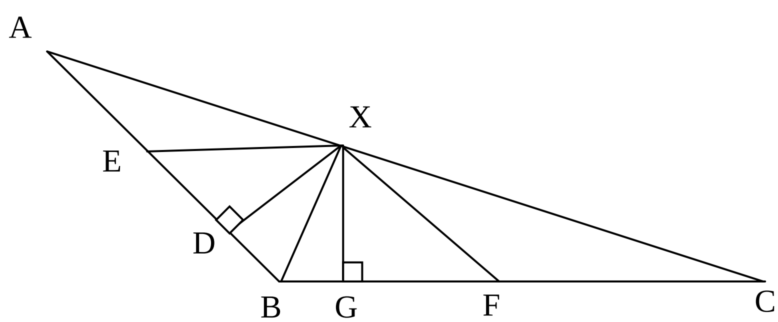
Complete according to the picture.



1. If AB = BC, then ____________ is a median of ▲APC.
2. If $\overline{PC}$ is a perpendicular bisector of ____________ then BC = DC.
3. If <APD is a right angle, then _________and ___________ are altitudes.
4. If $\overline{PC}$ is a median of ▲PBD, then ______________________
5. If BC = CD and $\overline{PC} \perp \overline{BD}$, then ___________ is a perpendicular bisector of __________.
6. If $\overline{PC}$ and $\overline{AC}$ are both altitudes of ▲PCA, then ___________is a right angle.



1. If $\overrightarrow{BX}$ bisects <ABC , then <________ ≅ <_______ and DX = _______.
2. If $\overline{DX}$ is the perpendicular bisector of $\overline{EB}$, then ED = _______ and XE = __________.
3. If XB = XF, then _________ is the perpendicular bisector of $\overline{BF}$, and < XBF ≅ __________.
4. If XD = XG, then ____________is the bisector of <_________________.

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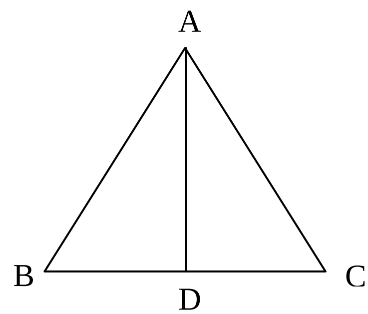
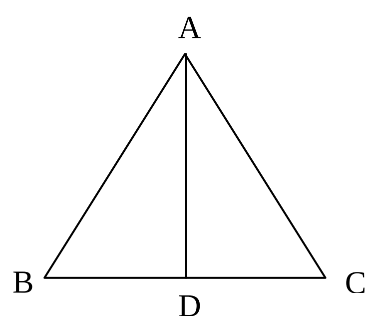
Prove: The bisector of the vertex angle of an isosceles triangle is also the perpendicular bisector of the base.



Prove: If an altitude of a triangle bisects the side to which it is drawn, then the triangle is isosceles.



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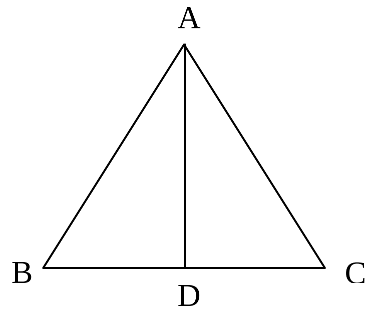
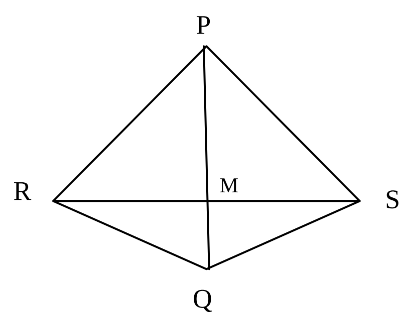
Prove: The medians to the congruent sides of an isosceles triangle are congruent.



Given: $\overline{PQ}$ bisects < P
$\overline{PQ}$ bisects < Q

Prove: $\overline{PM}$ is the altitude of $\triangle$ PRS



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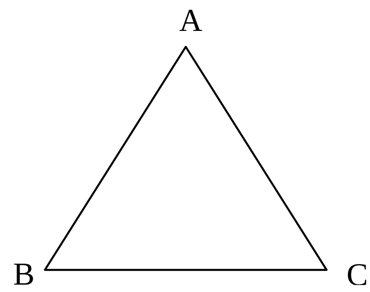
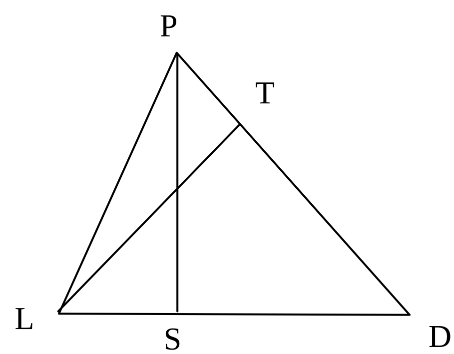
Prove: The bisectors of the base angles of an isosceles triangle form with the base another isosceles triangle.



Given : $\overline{PS}$ AND $\overline{LT}$ are altitudes.
$\overline{PT}$ $\overline{LS}$
Prove : <SPL ≅< TLP



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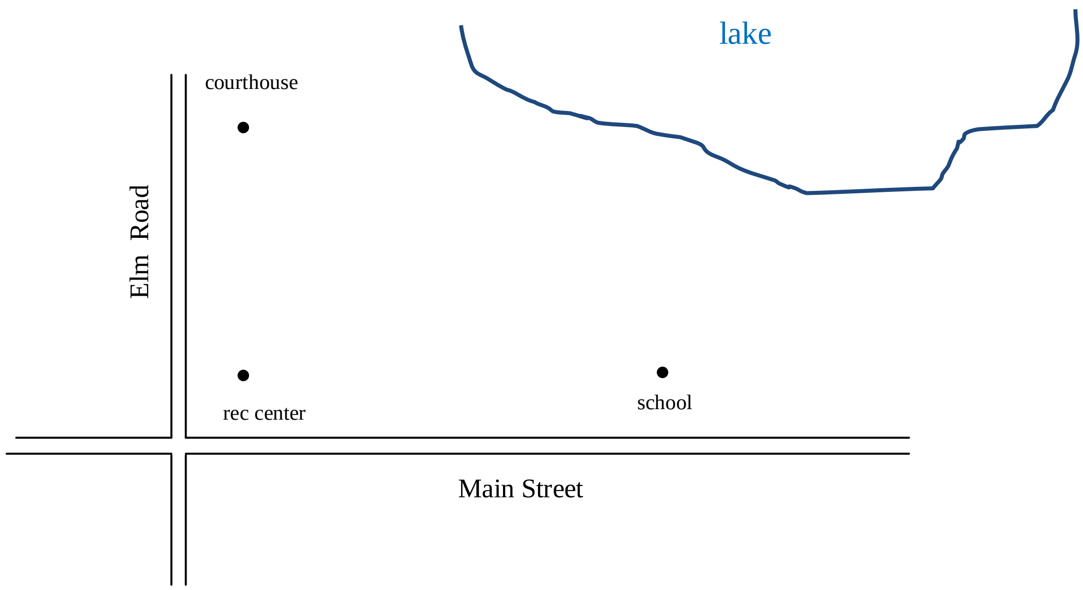
A) A town wants to build a beach on the lake front equidistant from the recreation center and the school. Show point B where the beach house should be located.

b) The town also wants to build a boat-launching site that is equidistant from Elm Road and Main Street. Find the point L where it should be built.

c) On your diagram, locate the spot F for a flagpole that is to be the same distance from the recreation center, the school and the courthouse.



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EXTRA CREDIT

Given: $m\angle RTS = 90°$,
$\overleftrightarrow{MN}$ is the $\perp$ bisector of $\overline{TS}$
Prove: $\overline{TM}$ is a median