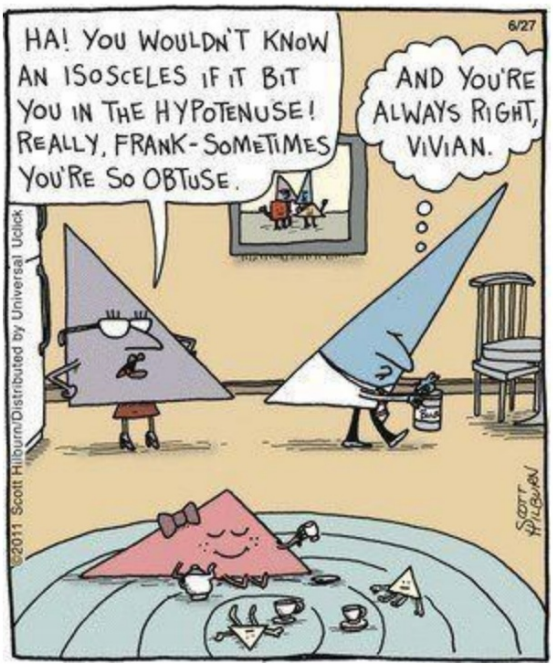
Geometry 5.1
Identify and use perpendicular bisectors in triangles
Identify and use angle bisectors in triangles

perpendicular ⊥ 90°
bisector 2 = parts
concurrent lines
point of concurrency
circumcenter
incenter

activity: paper folding


6/27
HA! YOU WOULDN'T KNOW AN ISOSCELES IF IT BIT YOU IN THE HYPOTENUSE! REALLY, FRANK-SOMETIMES YOU'RE SO OBTUSE.
AND YOU'RE ALWAYS RIGHT, VIVIAN.
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MPQ P. 323

Construction Perpendicular Bisector

Construct a perpendicular bisector of the side of a triangle.

Step 1

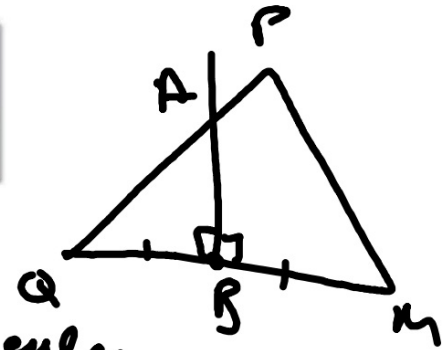
Draw, label, and cut out $\triangle MPQ$.

Step 2

Fold the triangle in half along $\overline{MQ}$ so that vertex M touches vertex Q.

Step 3

Use a straightedge to draw $\overline{AB}$ along the fold. $\overline{AB}$ is the perpendicular bisector of $\overline{MQ}$.



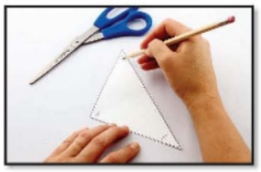
perpendicular bisector

ABC p. 323

Construction Angle Bisector

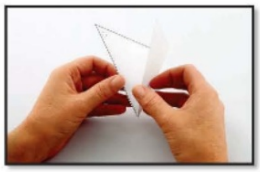
Construct an angle bisector of a triangle.

Step 1



Draw, label, and cut out $\triangle ABC$.

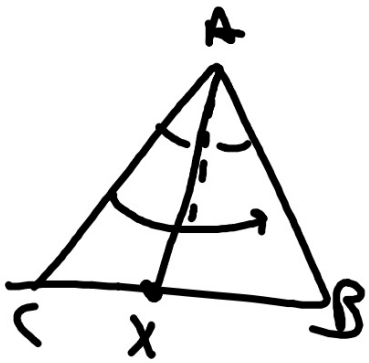
Step 2



Fold the triangle in half through vertex A, such that sides $\overline{AC}$ and $\overline{AB}$ are aligned.

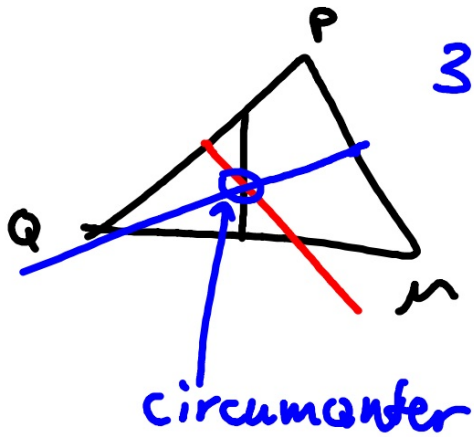
Step 3

Label point L at the crease along edge $\overline{BC}$. Use a straightedge to draw $\overline{AL}$ along the fold. $\overline{AL}$ is an angle bisector of $\triangle ABC$.



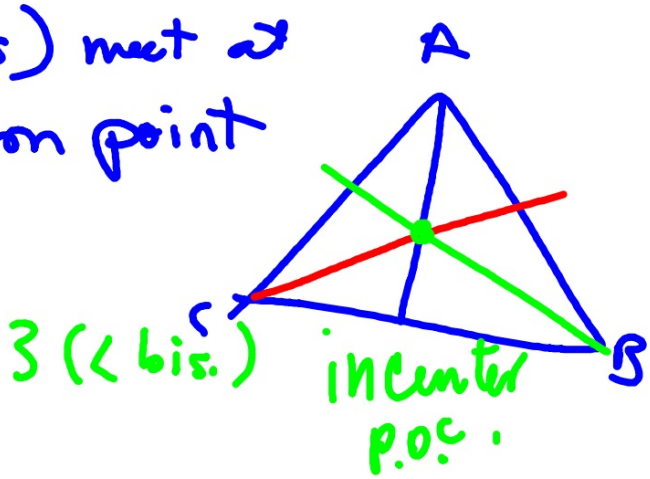
Model and Analyze

1. Construct the perpendicular bisectors and angle bisectors of the other two sides and angles of $\triangle MPQ$. What do you notice about their intersections?

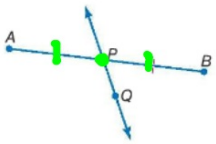


P.O.C.

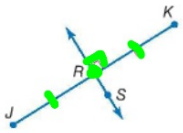
3 (⊥ bis) meet at common point



1 Perpendicular Bisectors In Lesson 1-3, you learned that a segment bisector is any segment, line, or plane that intersects a segment at its midpoint. If a bisector is also perpendicular to the segment, it is called a **perpendicular bisector**.



$\overleftrightarrow{PQ}$ is a bisector of $\overline{AB}$.



$\overleftrightarrow{RS}$ is a perpendicular bisector of $\overline{JK}$.

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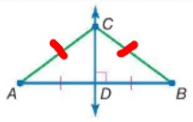
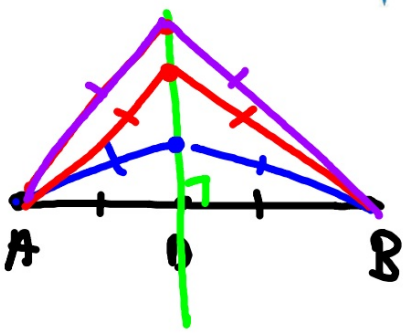
Theorems Perpendicular Bisectors

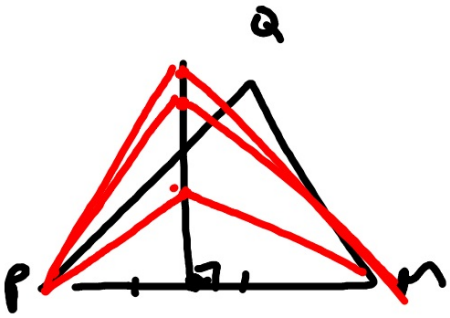
5.1 Perpendicular Bisector Theorem

If a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment.

Example: If $\overline{CD}$ is a $\perp$ bisector of $\overline{AB}$, then $AC = BC$.



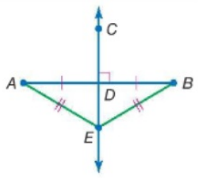


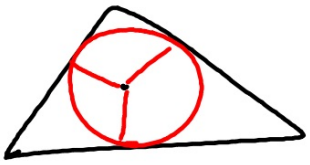


5.2 Converse of the Perpendicular Bisector Theorem

If a point is equidistant from the endpoints of a segment, then it is on the perpendicular bisector of the segment.

Example: If $AE = BE$, then E lies on $\overline{CD}$, the $\perp$ bisector of $\overline{AB}$.



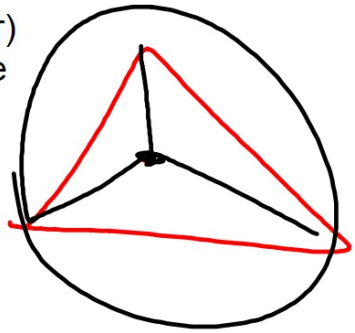


P.O.C.

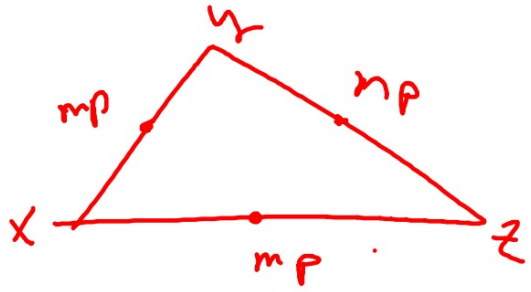
POC:
Angle bisectors (incenter)
Center of inscribed circle
Equidistant from sides

P.O.C.

(perp)



Perp bisectors
(circumcenter)
Center of circumscribed
circle
Equidistant from vertices



measure (mm)