

Section 5.3: Angle Bisectors

Essential Question: When can you conclude a pt is on the angle bisector?
How do you find the incenter?

Vocabulary

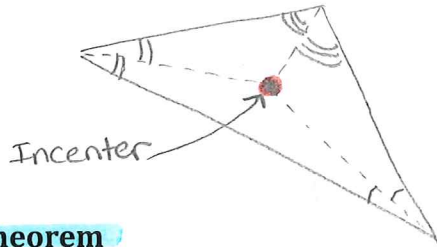
angle bisector

A ray that divides an angle into two congruent angles



incenter

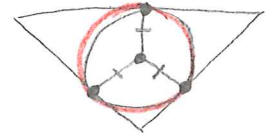
The point of concurrency for a Δ 's angle bisectors



inscribed circle

(circumscribed triangle)

A circle that intersects each side of a triangle exactly one time

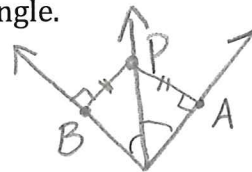


Theorem 5.5: Angle Bisector Theorem

If a point is on the angle bisector of an angle, then it is equidistant from the two sides of the angle.



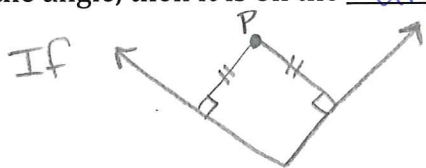
, then



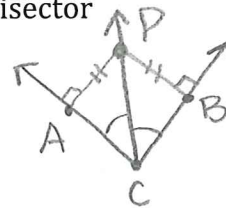
$BP = AP$

Theorem 5.6: Converse of Angle Bisector Theorem

If a point is in the interior and is equidistant from the sides of the angle, then it is on the angle bisector of the angle.



then

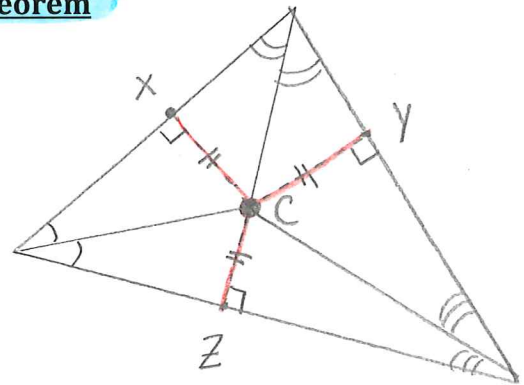


$\angle ACP \cong \angle BCP$

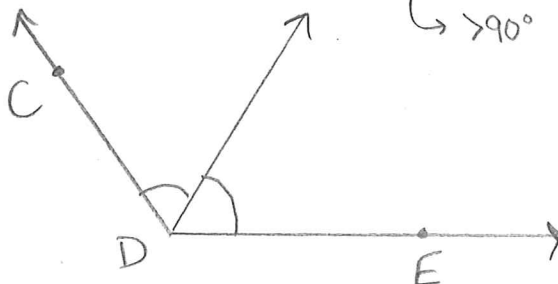
Theorem 5.7: Concurrency of \angle Bisectors of a Triangle Theorem

The angle bisectors of a triangle intersect at a point called the incenter that is equidistant to all of the sides of the triangle.

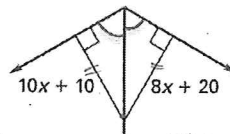
$CX = CY = CZ$



A1. Draw and mark the angle bisector of obtuse $\angle CDE$.

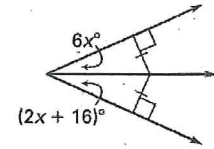


A2. Find the value of x and tell what theorem was used.

a. 

$10x + 10 = 8x + 20$
 $-8x \quad -10$
 $2x = 10$
 $x = 5$

Thm 5.5
Angle Bisector Thm

b. 

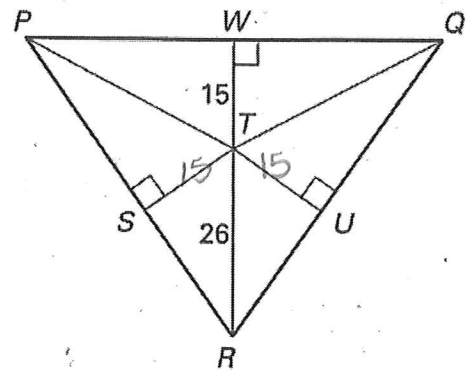
$6x = 2x + 16$
 $-2x$
 $4x = 16$
 $x = 4$

Thm 5.6
Angle Bisector Thm Converse

A3. Point T is the incenter of the triangle. Find...

a. $ST = 15 \text{ un}$ b. $TU = 15 \text{ un}$

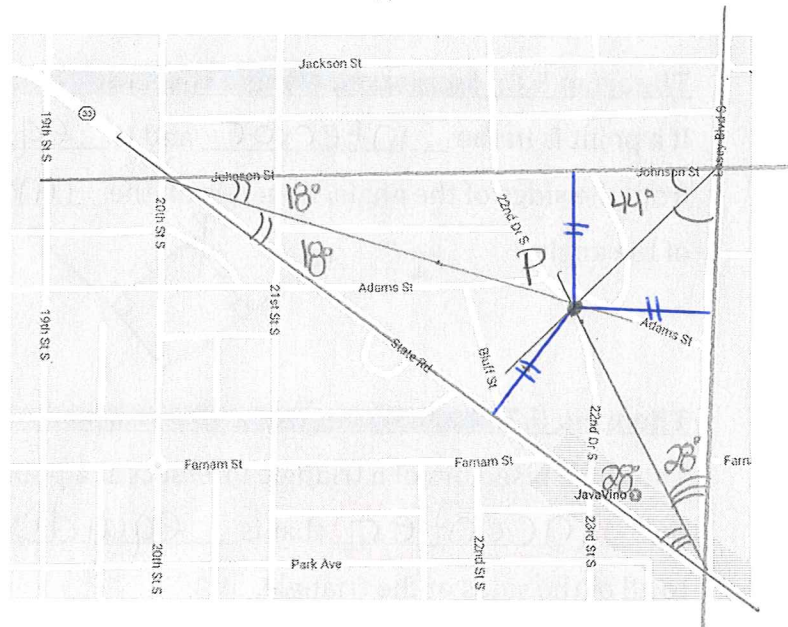
(Thm 5.7)
Concurrency of \angle
Bisectors Thm.



A4. You want to find a place to live so that you are the same distance from Losey Blvd, Jackson St, and State Rd.

Use the map to draw where you would find a place to live.

22ND Drive S. (Pt. P)
 Is about the same distance to Losey, Jackson & State Rd.



Section 5.3 Summary:

① A point is on the angle bisector of an angle if the point is equidistant to both sides of the angle.



② To find the incenter construct/draw the angle bisectors of all 3 angles in a Δ . Their intersection is the incenter. (see #4)