

Geometry CC - Unit 3

Lesson 3: The Circumcenter of a Triangle

Homework: HW Handout 3.3

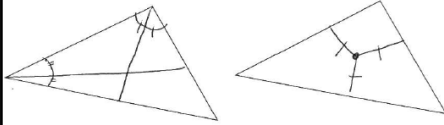
M1 L5

HW Answers 3.2

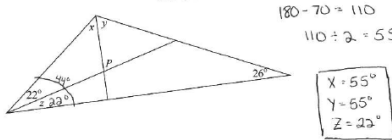
M1 L5 HOMEWORK

* Remember: The incenter is found by constructing the angle bisectors for each angle!

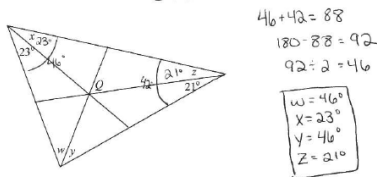
1. Sketch the incenter in 2 different ways.



2. In the triangle below, point P is the incenter. Find the measures of angles x, y, and z.



3. In the triangle below, point Q is the incenter. Find the measures of angles w, x, y, and z.



4)

$$w = 34^\circ$$

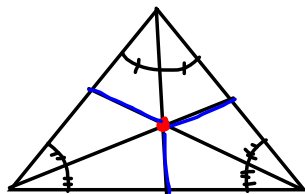
$$x = 68^\circ$$

$$y = 22^\circ$$

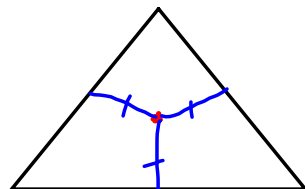
$$z = 22^\circ$$

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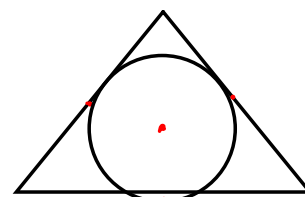
The Incenter....



The intersection of the triangle's three angle bisectors.



Equidistant from all three sides.



Center of the circle inscribed in the triangle.

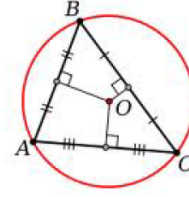
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Vocabulary:

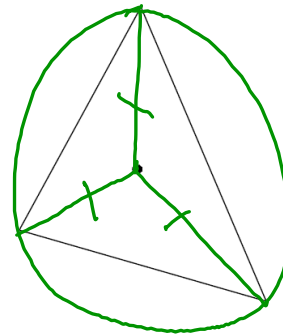
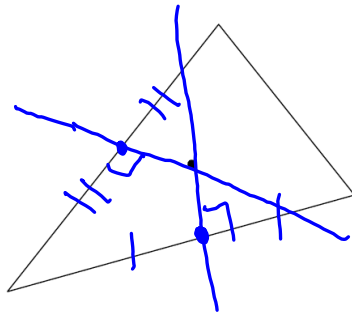
- Circumcenter - The point where the three perpendicular bisectors of a triangle intersect. One of a triangle's points of concurrency.

PROPERTIES OF THE CIRCUMCENTER:

- The center of the triangle's outer circle (circumcircle) that passes through all 3 of the triangle's vertices.
- The same distance away from the 3 vertices.
- It may lie outside of the triangle.



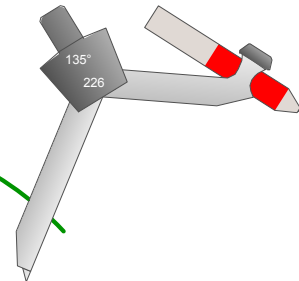
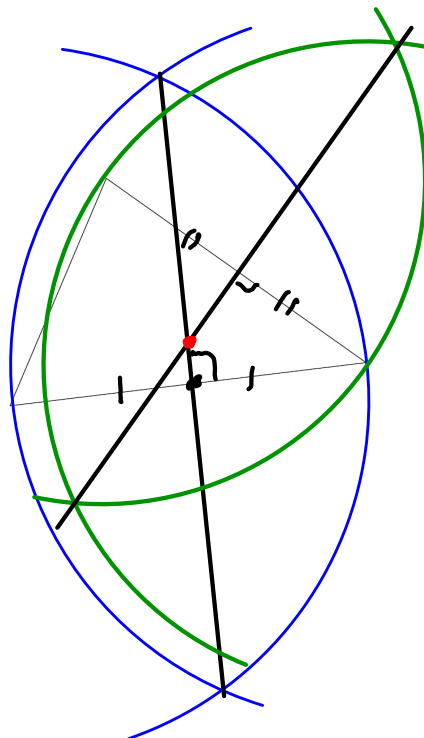
Sketch the circumcenter of the triangles below:



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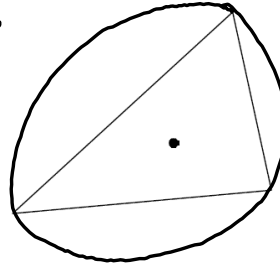
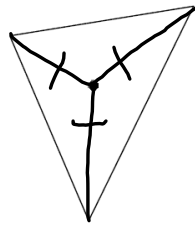
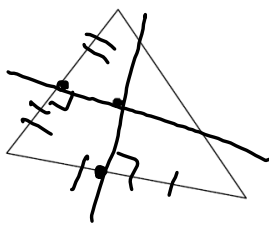
Let's CONSTRUCT the CIRCUMCENTER!

- * Construct the 3 perpendicular bisectors of the triangle below. (The point of intersection of all 3 perpendicular bisectors will be the circumcenter!)

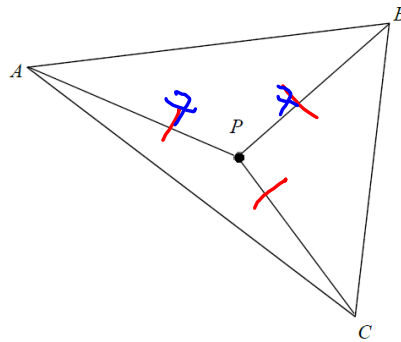


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For each triangle pair below, sketch to show that the given point is the circumcenter, in 3 different ways.



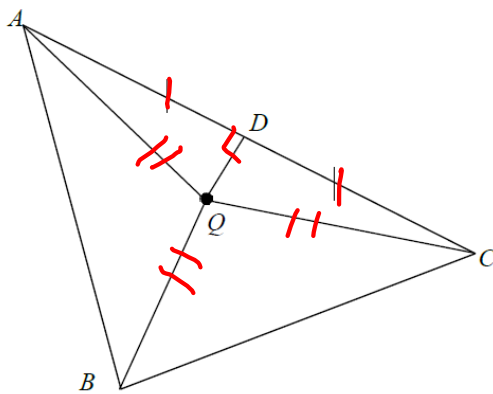
Example 1: If P is the circumcenter of the triangle below, which of the following choices **must** be correct? (Check all that apply)



- A) $\overline{AP} \cong \overline{PB}$ ✓
- B) $\overline{AP} \cong \overline{PC}$ ✓
- C) $\overline{AB} \cong \overline{BC}$ ✗
- D) $\overline{PB} \cong \overline{PC}$ ✓
- E) $\triangle APC$ is isosceles ✓
- F) If $m\overline{AP} = 7$, then $m\overline{PB} = 7$ ✓
- G) $\angle ABP \cong \angle PBC$ ✗

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Example 2: If Q is the circumcenter of the triangle below, which of the following choices **must** be correct? (Circle all that apply)



- A) $\overline{AQ} \cong \overline{BQ}$ ✓
- B) $\overline{AD} \cong \overline{AQ}$ ✗
- C) $m\angle ADQ = 90^\circ$ ✓
- D) $\overline{BQ} \cong \overline{QC}$ ✓
- E) $\triangle AQB$ is isosceles ✓
- F) $\angle ABQ \cong \angle QBC$ ✗

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