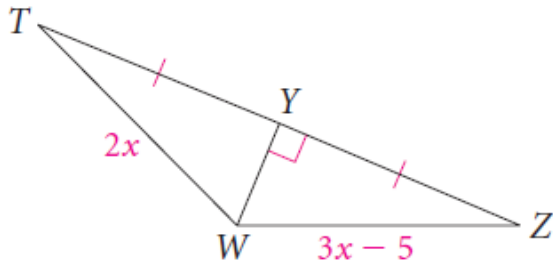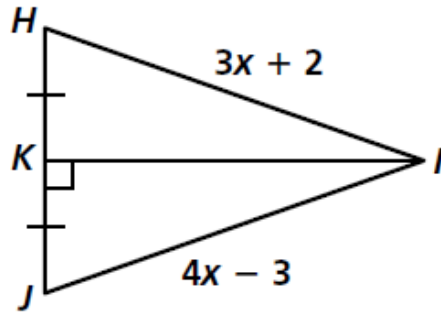1. Apply the Perpendicular Bisector Theorem or the Angle Bisector Theorem.
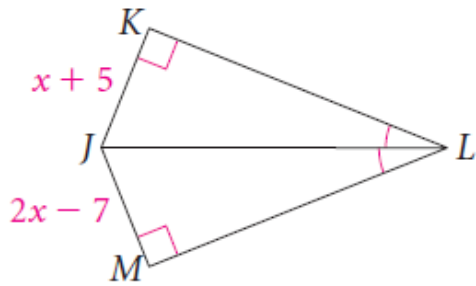
a. Find the value of x.

T

$2x$

Y

W $3x - 5$

Z

b. Find the value of x.

H

$3x + 2$

K

I

J

$4x - 3$

c. Find the value of x.

K

$x + 5$

J

$2x - 7$

M

L

d. Find the value of y.
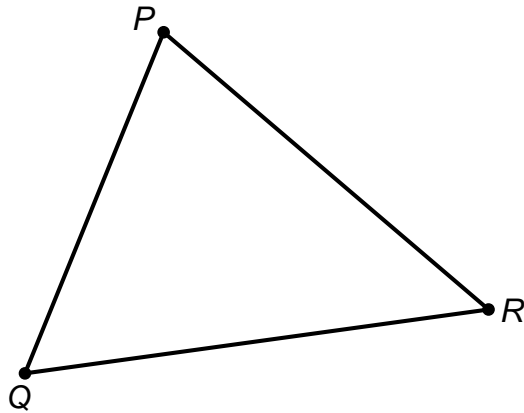
Q

P

$6y$ S $8y - 7$

R
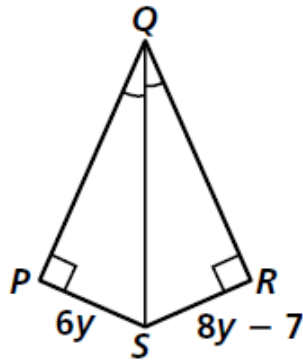
2a. Construct the Circumcenter of $\triangle ABC$ and label it D.

A

B

C
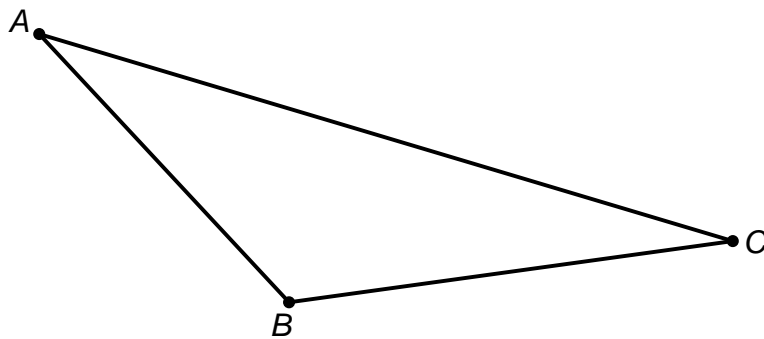
b. Draw $\triangle ADB$. What kind of triangle is $\triangle ADB$. Explain your reasoning.

3a. Construct the Circumcenter of $\triangle PQR$ and label it D.

b. Construct a circle centered at D with a radius of DR. This circle **circumscribes** $\triangle QPR$ because it passes through all three vertices of the triangle. (*Did yours work out?*) Explain why the circle must pass through all three points (P, Q, and R).

3a. Construct the Incenter of $\triangle ABC$ and label it D.
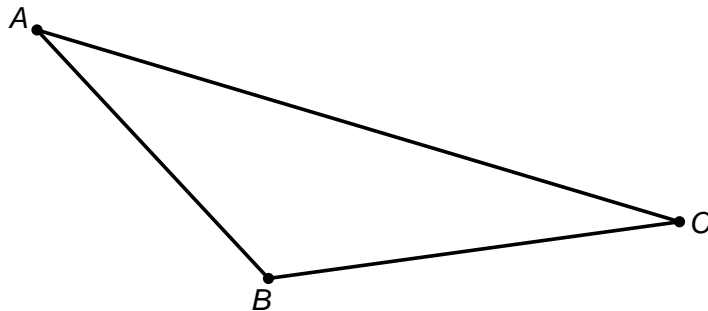
b. True or False: D is closer to side $\overline{AB}$ than side $\overline{BC}$. Explain your answer.

4a. Construct the Incenter of $\triangle PQR$ and label it D.
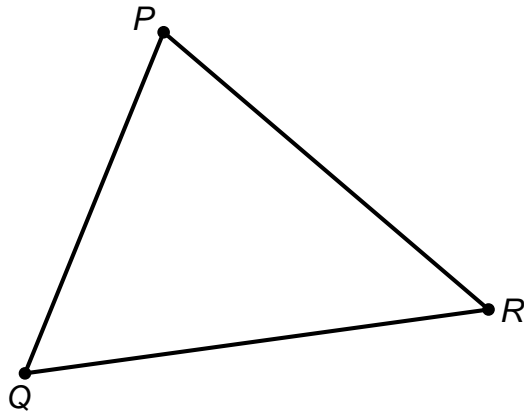
b. Use a protractor to find the point A on $\overline{QR}$ such that $\overline{DA} \perp \overline{QR}$. Construct a circle centered at D with a radius of DA. This circle is **inscribed** inside $\triangle QPR$ because it touches all three sides of the triangle. (*Did yours work out?*) Explain why the circle must touch all three sides of the triangle.

5. Based on your constructions of the Circumcenter and the Incenter, what is the minimum number of bisectors that must be constructed in a triangle to find either center? Explain your reasoning.