Name_____ **Date** _____ **Pd** ___

6.1 – 6.4 Points of Concurrency in Triangles Airport Review CYU

☑ *Use when you get it right all by yourself*

S *Use when you did it all by yourself, but made a silly mistake*

H *Use when you could do it alone with a little help from teacher or peer*

G *Use when you completed the problem in a group*

X *Use when a question was attempted but wrong (get help)*

N *Use when a question was not even attempted*

CONCEPTS	BASIC	INTERMEDIATE	ADVANCED
Locating the POC	1e, 2e		
Midpoint Formula	1a, 3b		
Slope Formula	1b, 2a, 2c	3c	
Perpendicular Slope		2a, 2c, 3d	3a
Writing Equations	1c, 1d	2b, 2d, 3d	3a
Solving Systems(substitution or elimination)	1e	2e, 3d	
Graphing points, slopes, and lines	1e		
Distance Formula	1f	2f	3f
Rounding Numbers	1f	2f	3f
Applying Math to Real-World Scenarios			4 – 9
Midsegment Properties		10 - 21	

An airport construction company has been hired to construct a regional airport with some restrictions. The community wants the airport to be located as close as possible to all three towns, but closest to the largest town, Town S. Three engineers (who happen to be very good mathematicians) suggest that they build the site on the center of concurrency of the triangle formed by the 3 towns, but arguments ensue.

One engineer (Fuchs) thinks that the centroid of the triangular region would be best, another (Sturmer) says that the orthocenter would be optimal, the third (Jerrett) said that that the circumcenter of the triangular region would be the best location.

The engineers lay the cities on a map and locate Town M at (0, 0) Town N at (8,0) and Town S at (4,6) (Units represent miles).

Use your own graph paper and attach when you turn this into your folder.

1. **Find the coordinate of the centroid by following the steps below.**

   A) Find the midpoint of $\overline{NS}$, connect M to the midpoint on the graph._____

   B) Find the slope of the median from M to $\overline{NS}$. _____

   C) Write the equation of the median from M to $\overline{NS}$ by using point slope._____

   D) Write the equation of the median from S to $\overline{MN}$. _____

   E) Solve the system to find the point of intersection (the centroid). _____ (Place the centroid on the graph and label it.)

   F) Find the distance from the centroid to each of the towns.

   Centroid to Town S = _____

   Centroid to Town N= _____ (distance formula, round to nearest 1000^{th})

   Centroid to Town M =_____ (distance formula, round to nearest 1000^{th})

2. Find the coordinates of the orthocenter by following the steps below

A) Find the slope of $\overline{MN}$, what is the opposite reciprocal? Draw the altitude from S to $\overline{MN}$. _____

B) Write the equation of the altitude from S to $\overline{MN}$. _____

C) Find the slope of $\overline{MS}$, what is the opposite reciprocal? Draw the altitude from N to $\overline{MS}$. _____

D) Write the equation of the altitude from N to $\overline{MS}$. _____

E) Solve the system to find the point of intersection (the orthocenter.)_____ (Place the orthocenter on the graph and label it.)

F) Find the distance from the orthocenter to each of the towns.

Orthocenter to Town S = _____

Orthocenter to Town N= _____(distance formula, round to nearest 1000^{th})

Orthocenter to Town M =_____(distance formula, round to nearest 1000^{th})

3. Find the coordinates of the circumcenter by following the steps below

A) Write the equation of the perpendicular bisector of $\overline{MN}$. _____

B) Find the midpoint of $\overline{MS}$._____

C) Use the opposite reciprocal slope of $\overline{MS}$ and the midpoint to write the equation of the perpendicular bisector of MS. Draw the perpendicular bisector of $\overline{MS}$._____

D) Solve the system to find the point of intersection (the circumcenter)._____ (Place the circumcenter on the graph and label it.)

E) Find the distance from the circumcenter to each of the towns.
Circumcenter to Town S = _____

Circumcenter to Town N= _____(distance formula, round to nearest 1000^{th})

Circumcenter to Town M =_____(distance formula, round to nearest 1000^{th})

Follow-up questions: (Justify your answers with an explanation or proof.)

4. In this situation which point is closest to Town S (which point should they use)?

5. WHO WAS RIGHT??

6. What did you notice about the centroid, orthocenter, and circumcenter from vertex S?

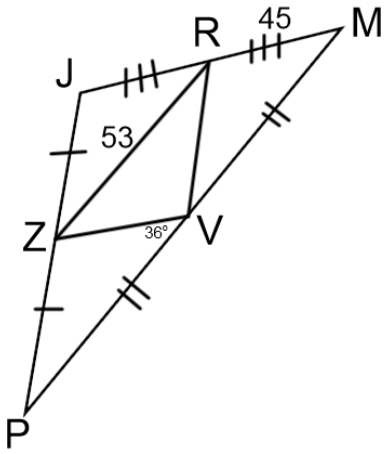
7. What did you notice about the distances for points M and N from all of the points of concurrency? Why?

8. **What did you notice about the distances from the circumcenter to all three towns, why?**

9. **What happens to the points of concurrency if the triangle is equilateral?**

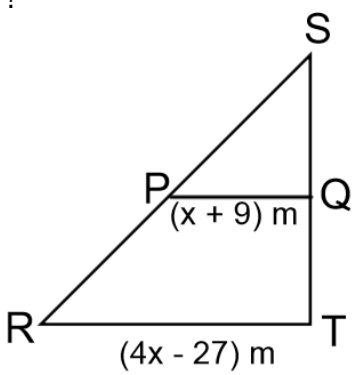
6.4 Midsegment Review

10. Find ZV, PM, and m∠RZV in ΔJMP.



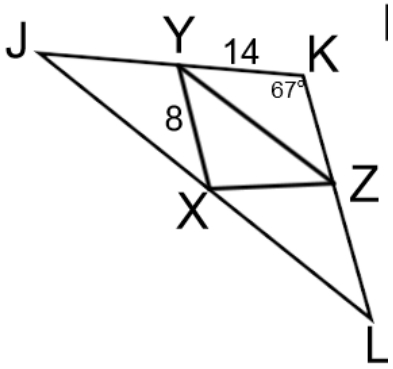
11. $\overline{PQ}$ is a midsegment of triangle RST. What is the length of $\overline{RT}$?

A. 9 meters
B. 21 meters
C. 45 meters
D. 63 meters



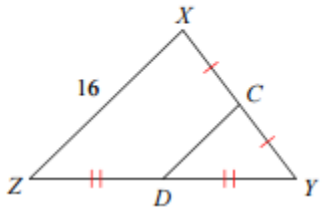
12. ΔXYZ is the midsegment triangle of ΔJKL, XY = 8, YK = 14, and m ∠ YKZ = 67°. Which of the following measures CANNOT be determined?

A. KL
B. JY
C. m ∠ XZL
D. m ∠ KZY

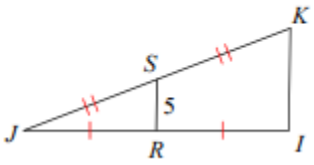


State which two line segments are parallel and then solve for the indicated side.

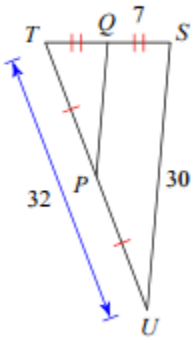
13. Find CD



14. Find IK

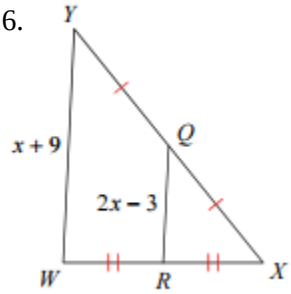


15. Find PQ

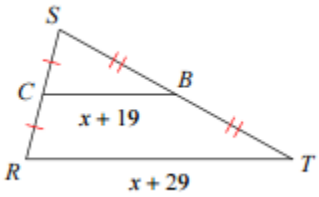


Solve for x.

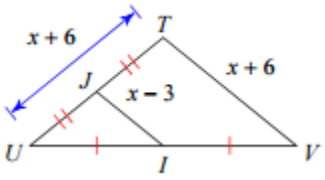
16.



17.

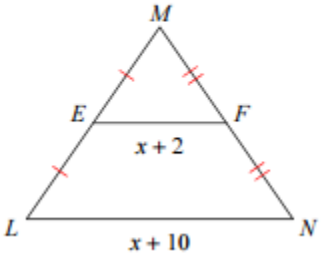


18.

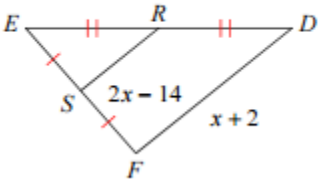


Find the missing side indicated.

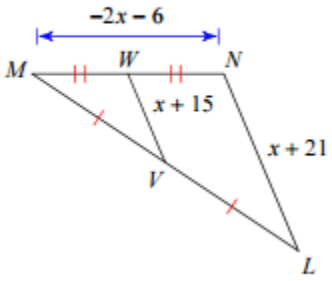
19. Find LN



20. Find SR



21. Find VW



CYU Reflection: *How far can you go: basic, intermediate, or advanced?*

Rate your mastery level!

How confident are you with the skills this CYU covered? Circle the score you would give yourself.