

First Thing I do is **Graph & Label**  $\triangle STU$

**Point S (0,2)** (0 right, 2 up)

**Point T (4,6)** (4 right, 6 up)

**Point U (8,0)** (8 right, 0 up)

Second Thing I do is Find EXACT Midpoints.

$$\left( \frac{X_1 + X_2}{2}, \frac{Y_1 + Y_2}{2} \right) \text{ so for Point A (Midpoint of ST)} \left( \frac{0+4}{2}, \frac{2+6}{2} \right) = \text{Point A is (2,4) Graph and Label}$$

$$\left( \frac{X_1 + X_2}{2}, \frac{Y_1 + Y_2}{2} \right) \text{ so for Point B (Midpoint of TU)} \left( \frac{4+8}{2}, \frac{6+0}{2} \right) = \text{Point B is (6,3) Graph and Label}$$

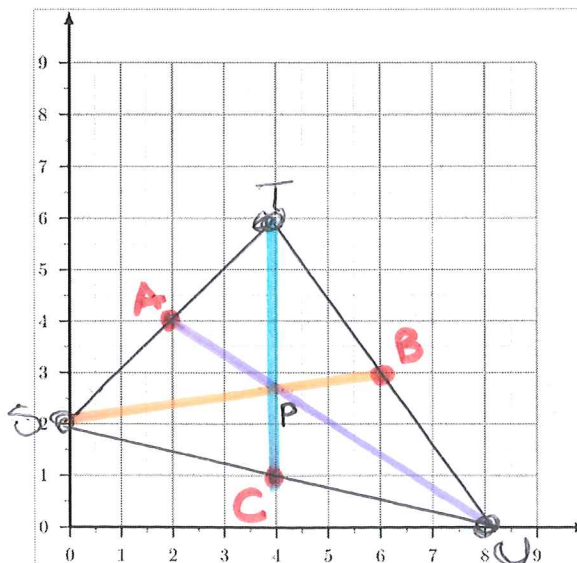
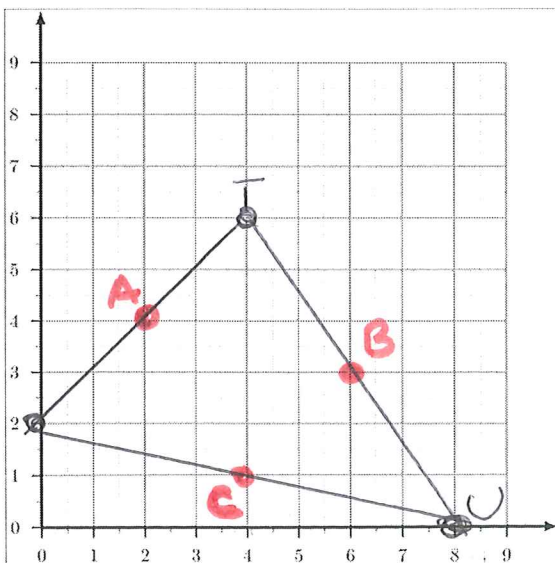
$$\left( \frac{X_1 + X_2}{2}, \frac{Y_1 + Y_2}{2} \right) \text{ so for Point C (Midpoint of SU)} \left( \frac{0+8}{2}, \frac{2+0}{2} \right) = \text{Point C is (4,1) Graph and Label}$$

Looks like this with the Midpoints drawn in

To draw the Medians Connect Midpoints to Triangle Vertex(Points)

A Connects to U    B Connects to S    C Connects to T

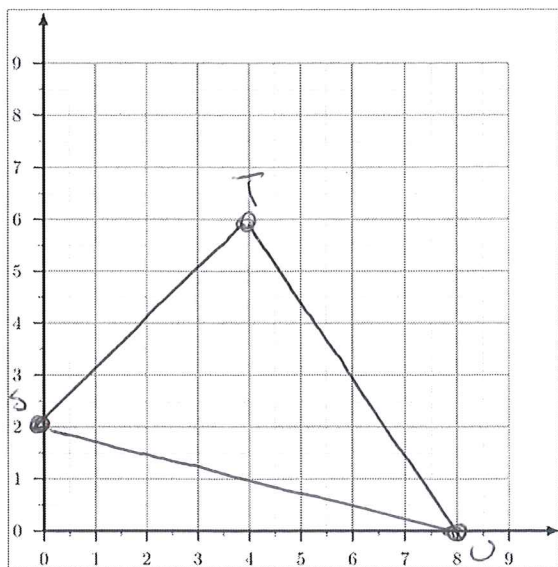
AU is Median    BS is Median    CT is Median



Final Picture

Centroid P is  
where those 3  
Medians Cross  
about  
2.8, 4

Remember  
Extra Power is  
1/3 Small Piece  
ii PB  
2/3 Big Piece  
PS  
Whole Median  
BS



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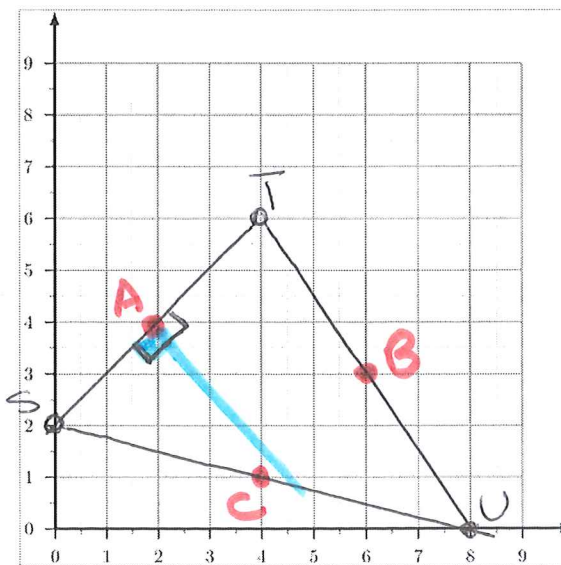
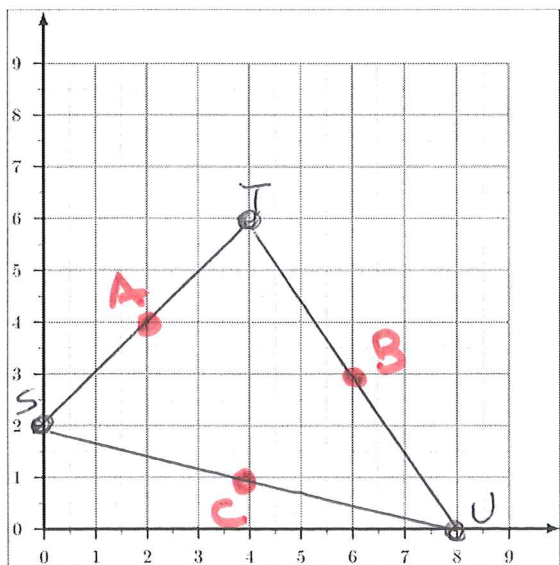
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$$\left( \frac{X_1 + X_2}{2}, \frac{Y_1 + Y_2}{2} \right) \text{ so for Point C (Midpoint of SU)} \left( \frac{0+8}{2}, \frac{2+0}{2} \right) = \text{Point C is (4,1) Graph and Label}$$

Looks like this with the Midpoints drawn in

To draw the Perpendicular Bisectors you have to Make a Right Angle from Point A. Notice this will NOT TOUCH THE Vertex of Triangle. You can estimate a Right Angle with a corner of a Paper



Just with  
Perpendicular  
Bisector for A  
drawn in

Use a corner  
of a paper  
notice  
right angle

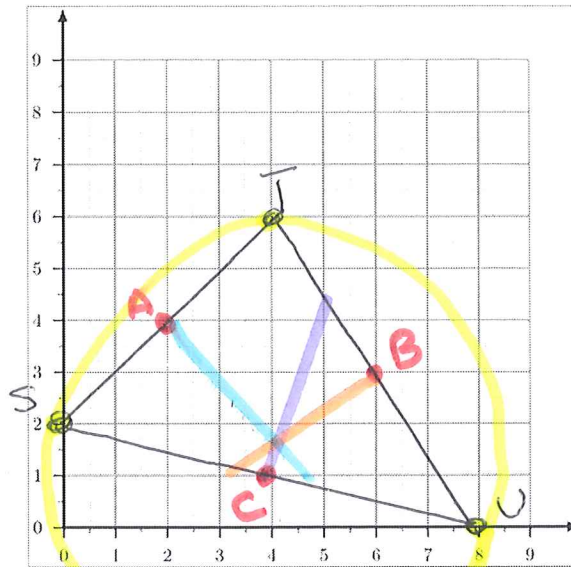
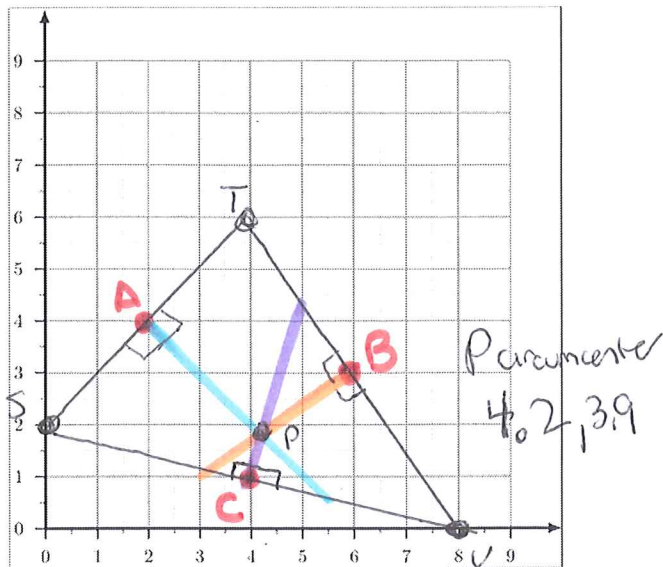
# Continued Circumcenter right side 1st page

All 3 Perpendicular Bisectors Drawn In

Blue Orange Purple

Where those 3 Lines Intersect "X" is the Circumcenter.

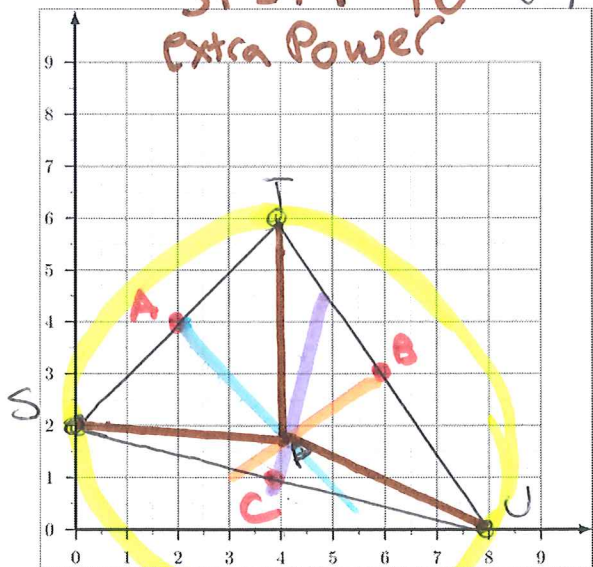
Sketch a Circle OUTSIDE the Triangle



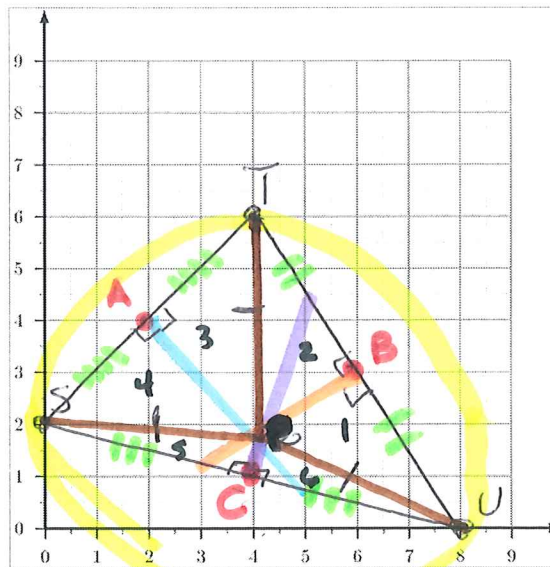
If compass put on P, T  
Twirl compass

Now you can Draw in Radius of the Circle from the Circumcenter to the Points of Triangle

Brown Line  
 $SP = PT = PU$   
Extra Power  
(4, 1.8)



Finally Look at all the Congruent Marks and Right Angle Marks we can Draw In



$SP = PT = PU$

all Brown  
1 Hash  
6 right angles

$BT = TU$   
 $SC = CU$   
 $AS = AT$

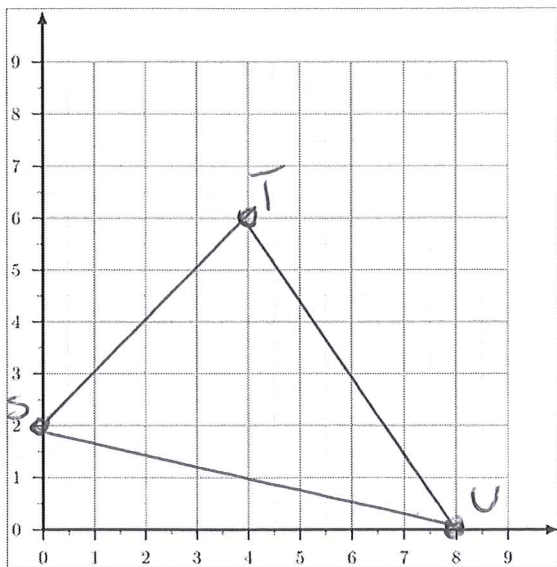
Circle estimated  
might use  $A^2 + B^2 = C^2$   
example  $PC^2 + CS^2 = PS^2$

Congruent  
right  $\Delta$

$\Delta PBU \cong \Delta PBT$

$\Delta PAT \cong \Delta PAS$

$\Delta PCS \cong \Delta PCU$



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Second Thing I do is Draw in Altitudes as best I can

Altitudes DO NOT (usually) touch Midpoints (Unless Isoceles)

Altitudes DO touch the Corners of Triangles

Altitudes MAKE 90 Degree Angles

**So I take a Straight Edge from Point S and keep moving it around Line TU until I form a Right Angle then I draw it**

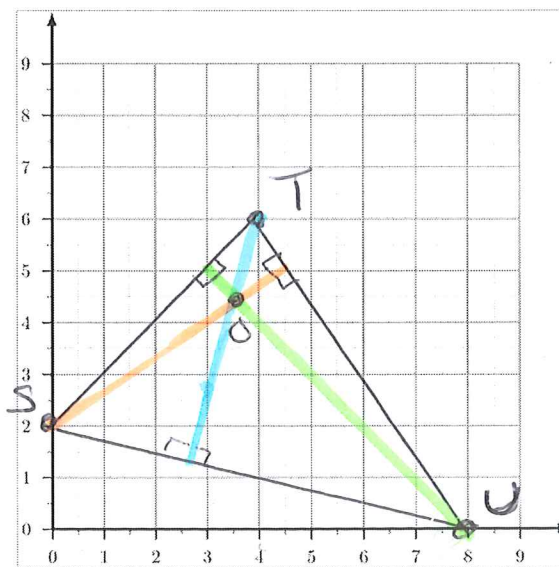
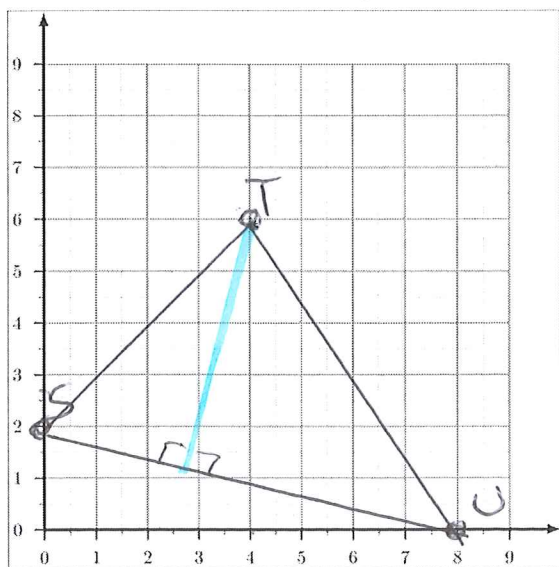
Looks like this Just **1** Altitude

Looks Like this with All 3.

Point P is Orthocenter

$(3.5, 4.5)$

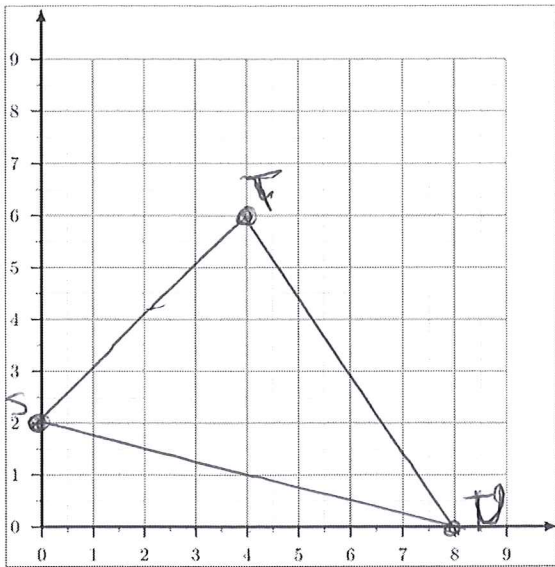
Blue Alt.  
Orange Alt.  
Green alt.



Final Picutre

Draw in Right  
Angles

Incenter / Angle Bisector Answer Key



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Second Thing I do cut those Yellow Angles in Half as Best I can.

I draw a line across the Triangle.

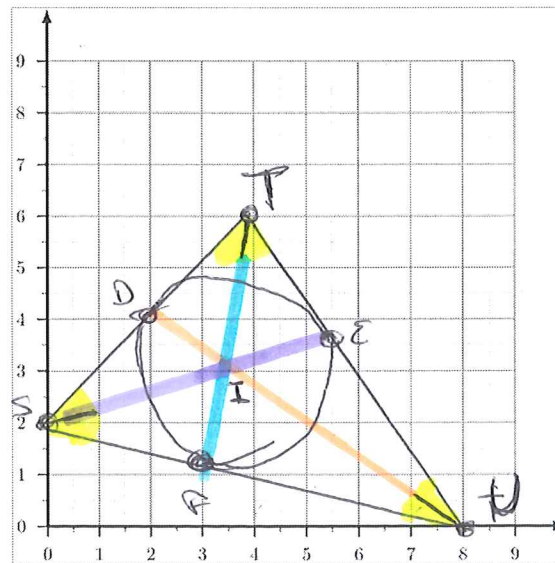
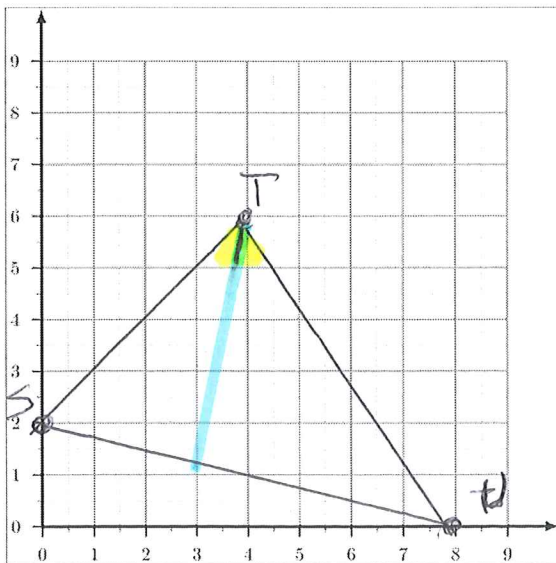
Usually this won't be Right Angles unless Isocoles Triangle

Looks like this Just 1 Angle Bisector

Looks Like this with All 3. Point I is Incenter

About  
(3.5, 3.1)

Draw in



Final Picutre

Draw in Circle Inside.

Notice all the Inside Radius

Are equal

I'D Part of  
I'E Part of  
I'F Part