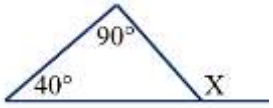
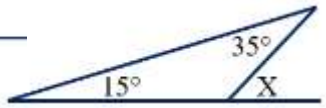
10th Grade Assignment – Week #9

Group Assignment:

for Tuesday.

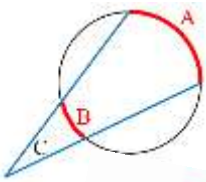
- **Triangle Exterior Angle Theorem**
  An exterior angle of a triangle is the angle on the outside of a triangle when you extend one of the triangle's sides. With each of the drawings on the right, the exterior angle is labeled as "X".



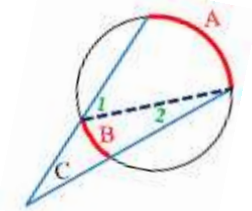


  For each of these triangles, determine the value of X, and then (most importantly) give the statement for the *Triangle Exterior Angle Theorem*. (Hint: The exterior angle has a special relationship to the triangle's interior angles. For Euclid, this is Theorem I-32.)

- **Outside Angle Theorem**
  We now know that the formula for two secants intersecting outside the circle is $\mathbf{C = \frac{A-B}{2}}$ We will now prove this formula.



  1) Given the drawing (above, right) with a circle and two secants intersecting outside the circle, and labelled as shown with A, B, and C.
  2) Create a triangle by adding a line that connects the opposite ends of the arcs, as shown with the second drawing.



  3) What does the *Triangle Exterior Angle Theorem* say about $\angle 1$?
  4) What does the *Inscribed Angle Theorem* say $\angle 1$ is equal to? And what about $\angle 2$?
  5) Somehow put together the equations from the above two steps in order to finish the proof.

- **Circle Geometry Practice**
  Work together on **Problem Set #1** of the *Circle Geometry* unit of the workbook.

Individual Work

- **Important!!**
  Before Thursday's group meeting, be sure that you have at least 3 drawings of the *Centers of a Triangle* that can be shared with the group. This was part of last week's assignment. If you didn't do it then, then do it now. If you are still having troubles, then re-watch yesterday's (Monday's) lecture where I demonstrated how to construct each of the four centers.
  Your triangles can be any shape, but it is good to have one that is obtuse. Remember, it is best to have your original triangle in black ink, the construction lines lightly in pencil, and you should clearly mark each of the four centers in different color so that you can show it to the others in your group.

- **Finish up.** Continue working on the group assignments (from Tuesday, above, and from Thursday, below) that your group didn't complete.

for Thursday

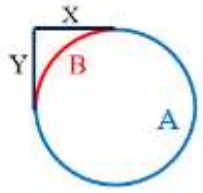
- **The Four Centers of a Triangle**

  As instructed (above), everyone in the group should have three drawings of triangles clearly showing the four centers. These drawings should help you to answer the following questions:

  What does the triangle need to be so that…

  1) all four centers coincide?
  2) all four centers fall along a straight line?
  3) three of the centers fall along a straight line?
  4) some of the centers fall outside of the triangle?
  5) some of the centers fall exactly on the perimeter of the triangle?

- **The Intersecting Tangent Theorem**



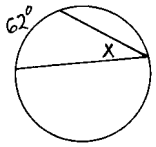
  6) Draw two tangents to a circle such that they intersect on the page. What can be said about the distances (X and Y) from the point of intersection to the two points of tangency? How can we be sure that this is always true?
  7) *Challenge!* Find a formula that relates the outside angle (C, located between X and Y, but not labeled in the drawing) to only the larger arc (A). Find another formula that relates C to the smaller arc (B).

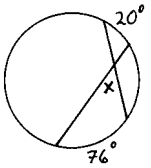
- **<u>Circle Geometry Practice</u>**
  Work together on **Problem Set #2** of the *Circle Geometry* unit of the workbook.

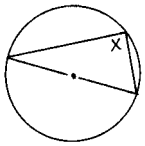
Problem Set #1

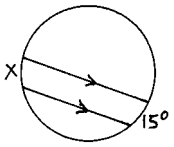
Homework

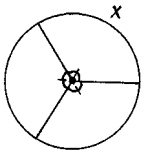
For each drawing, find x, and name the theorem that allows you to find x.

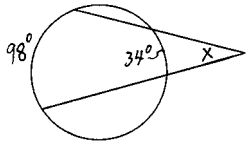
1) 

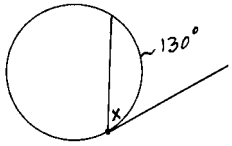
2) 

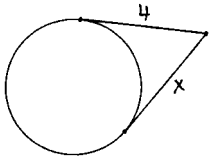
3) 

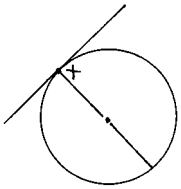
4) 

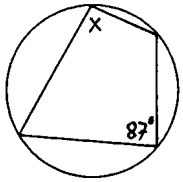
5) 

6) 

7) 

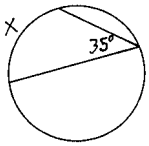
8) 

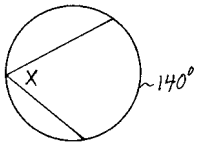
9) 

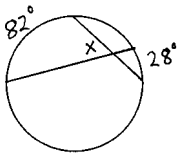
10) 

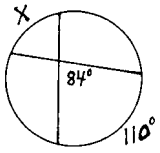
Problem Set #2

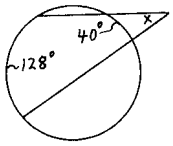
Find each variable.

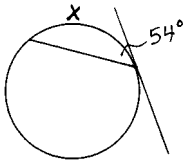
1) 

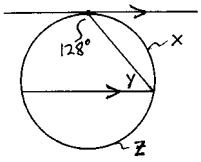
2) 

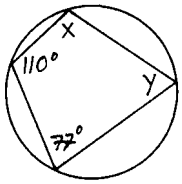
3) 

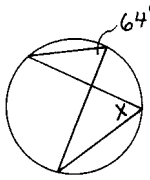
4) 

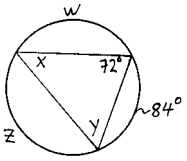
5) 

6) 

7) 

8) 

9) 

10) 

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