

## 10<sup>th</sup> Grade Assignment – Week #14

### Announcements:

- During these next three weeks, group work will focus on preparation for the presentations. The presentations take place during Week #17. In Week #18 you will resume with your normal groups.
- During these next three weeks, if you are not doing a presentation, or if your group would like to have some extra material to work on, I will be sure to give some (optional) “extra problems” for you to work on.

### Guidelines for the Presentations (Week #17):

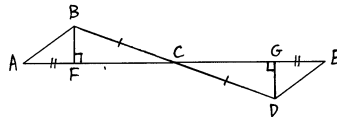
- Your presentation should be between 30 and 40 minutes, and will take place in a Zoom meeting.
- I will host the meeting, and make you co-host so that you can share your screen, and not be muted. I will spotlight whoever is talking.
- Everything you do must be done live. Do not share video recordings as part of your presentation.
- Other Math Academy 10<sup>th</sup> graders will be attending your presentation. Your central task is to teach them – as best you can – about the topic you have prepared. You may also wish to invite other friends and family to attend your presentation.
- The presentation will be recorded (unless you wish me not to do so). I will then send you the recording which you can download and/or share with others.
- Your presentations should have four components: (1) Intro – which includes context and a statement of the question you are answering, (2) Background of what is needed to fully understand your proof, (3) The main presentation, which is the bulk of the time, and (4) Conclusion – re-emphasize what you have done – QED!
- Unless I tell you otherwise, please don't do any research about your topic beyond the resources I am giving you – especially, do not watch a video about your topic. Why not? Because that would put the idea in your head, in some way, about what your presentation should be. This would deprive you of the full creative experience of envisioning your presentation yourselves.
- Further tips for your presentation:
  - Each presenter in the group should speak for roughly an equal amount of time.
  - Keep in mind that your audience is really interested to see you. You should begin and end the presentation so we can see you. It may be best to go back and forth from screen-sharing images and then talking to your audience (with your camera on).
  - Think carefully about how you can present your visuals effectively.
  - Avoid reading from a script – especially, don't read words off the screen. Speak naturally and try using note cards, with just a few words on each card to remind you of what to talk about.
  - Remember that your audience isn't familiar with your topic – so don't go too fast!
  - Involve your audience by finding opportunities to ask questions that require them to answer.
  - Above all, remember that this is a learning experience. Nobody is expecting perfection. I will be there during the presentation in case you need help.

### Individual Work

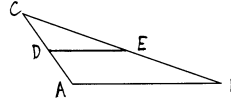
- Do what you can with these problems from **Problem Set #3** (*Proofs* unit), in this order: #1, 8, 4, 7, 16a, 17
- *Extra Problems:* **Problem Set #3:** problems #10, 16b  
and then **Problem Set #2** (see last's assignment): problems #21, 20.

### Problem Set #3

- 1) Given: As indicated.  
Prove:  $\angle A \cong \angle E$ .

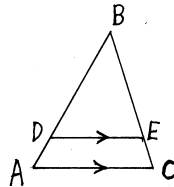


- 2) Triangle Midpoint Theorem.  
 What property can be stated about the line that joins the midpoints of two sides of a triangle? Prove it.

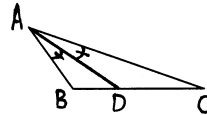


Fill in the table given the drawing shown here.

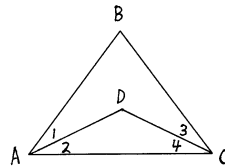
	BD	AD	AB	BE	CE	CB
3)		3		8		12
4)	16				10	25
5)	3	7				11
6)		$3\frac{3}{4}$		16	10	



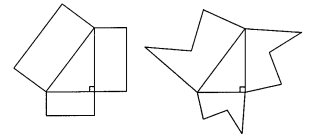
- 7) a) Given  $AB=10$ ,  $BD=6$ ,  $AC=24$ , find  $CD$ .  
 b) Given  $AB=10$ ,  $BD=6$ ,  $CD=15$ , find  $AC$ .  
 c) Given  $AB=10$ ,  $BD=6$ ,  $BC=20$ , find  $AC$ .



- 8) Given:  $AB \cong BC$ ;  $AD \cong CD$ .  
Prove:  $\angle 1 \cong \angle 3$ .  
 9) Given:  $AB \cong BC$ ;  $AD$  bisects  $\angle BAC$ ;  
 $CD$  bisects  $\angle BCA$ .  
Prove:  $AD \cong CD$ .



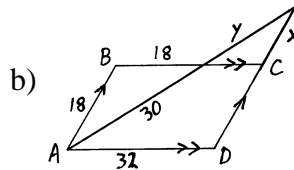
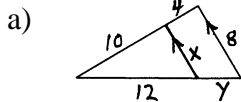
- 10) A General Pythagorean Theorem?  
 Do you think that the Pythagorean Theorem would work if you attached similar rectangles to the three sides of a right triangle? Or any shaped figures as long as they were similar? Give an explanation for your answer.



Complete each statement. (From *The Elements*, Book V)

- 11) If  $\frac{x}{5-w} = \frac{7}{5-w}$  then  $x = \underline{\hspace{2cm}}$   
 12) If  $c:y = y:5$  then  $y = \underline{\hspace{2cm}}$   
 13) If  $\frac{2x}{3} = \frac{w}{y}$  then  $\frac{8x}{9} = \underline{\hspace{2cm}}$   
 14) If  $\frac{x}{5} = \frac{7}{w}$  then  $\frac{x}{x+5} = \underline{\hspace{2cm}}$   
 15) If  $\frac{3}{x} = \frac{w}{y}$  then  $\frac{w-y}{y} = \underline{\hspace{2cm}}$

- 16) Find  $x$  and  $y$ .



- 17) Given: Regular hexagon ABCDEF;  $CD = 10$ ;  
 $Y$  is midpoint of  $EF$ ;  $X$  is midpoint of  $AB$ .  
Find:  $PQ$  and  $CY$ .

