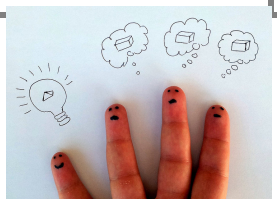
Ready, Set, Go!



Ready

Remember that when you write a congruence statement such as $\Delta ABC \cong \Delta FGH$, the corresponding parts of the two triangles must be the parts that are congruent. For instance, $\angle A \cong \angle F, \overline{AB} \cong \overline{FG}, \angle B \cong \angle G, \overline{BC} \cong \overline{GH}$. Also, recall that the congruence patterns for triangles, ASA. SAS, and SSS, are what we can use to justify triangle congruence.

The segments and angles in each problem below are corresponding parts of 2 congruent triangles. Make a sketch of the two triangles. Then write a congruence statement for each pair of triangles represented. State the congruence pattern that justifies your statement.

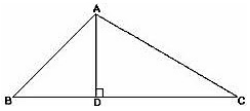
		Congruence statement	Congruence pattern
1.	$\overline{ML} \cong \overline{ZJ}, \overline{LR} \cong \overline{JB}, \angle L \cong \angle J$	a.	b.
2.	$\overline{WB} \cong \overline{QR}, \overline{BP} \cong \overline{RS}, \overline{WP} \cong \overline{QS}$	a.	b.
3.	$\overline{CY} \cong \overline{RP}, \overline{EY} \cong \overline{BP}, \angle Y \cong \angle P$	a.	b.
4.	$\overline{BC} \cong \overline{JK}, \overline{BA} \cong \overline{JM}, \angle B \cong \angle J$	a.	b.
5.	$\overline{DF} \cong \overline{XZ}, \overline{FY} \cong \overline{ZW}, \angle F \cong \angle Z$	a.	b.
6.	$\overline{WX} \cong \overline{AB}, \overline{XZ} \cong \overline{BC}, \overline{WZ} \cong \overline{AC}$	a.	b.

Set

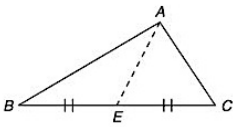
Recall the following definitions:

In a triangle:

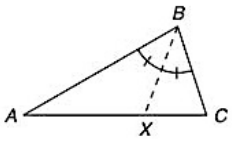
- an **altitude** is a line segment drawn from a vertex perpendicular to the opposite side (or an extension of the opposite side).



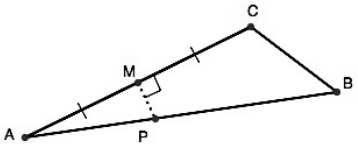
- a **median** is a line segment drawn from a vertex to the midpoint of the opposite side.



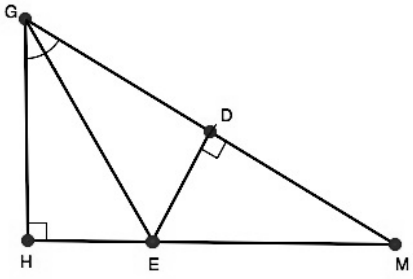
- an **angle bisector** is a line segment or ray drawn from a vertex that cuts the angle in half.



- a **perpendicular bisector of a side** is a line drawn perpendicular to a side of the triangle through its midpoint.



Be sure to use the correct notation for a segment in the following problems.



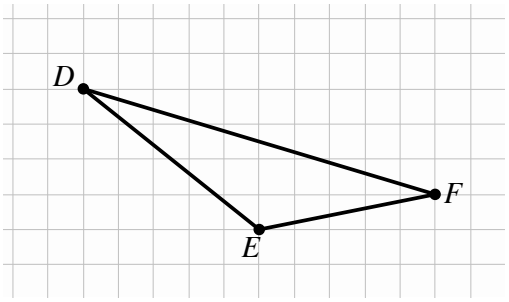
7. Name a segment in ΔGHM that is an altitude.

8. Name a segment in ΔGHM that is an angle bisector.

9. Name a segment in ΔGHM that is NOT an altitude.

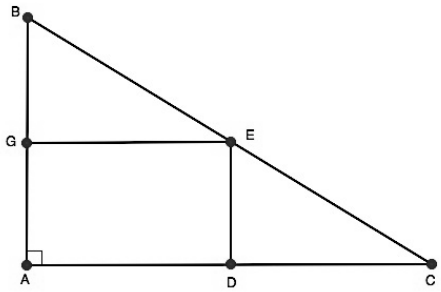
10. Create a perpendicular bisector by marking two segments congruent in ΔGHM. Name the segment that is now the perpendicular bisector.

Use ΔDEF in problems 11 – 13.



11. Construct the altitude from vertex D to $\overleftrightarrow{EF}$.
12. Construct the median from D to $\overline{EF}$.
13. Construct the perpendicular bisector of $\overline{EF}$.

Tehani has been studying the figure below. She knows that quadrilateral ADEG is a rectangle and that $\overline{ED}$ bisects $\overline{BC}$. She is wondering if with that information she can prove $\Delta BGE \cong \Delta EDC$. She starts to organize her thinking by writing what she knows and the reasons she knows it.



I know $\overline{ED}$ bisects $\overline{BC}$ because I was given that information

I know that $\overline{BE} \cong \overline{EC}$ by definition of bisect.

I know that $\overline{GE}$ must be parallel to $\overline{AD}$ because the opposite sides in a rectangle are parallel.

I know that $\overline{GA} \parallel \overline{ED}$ because they are opposite sides in a rectangle.

I know that $\overline{AD}$ is contained in $\overline{AC}$ so $\overline{AC}$ is also parallel to $\overline{GE}$.

I know that $\overline{GA}$ is contained in $\overline{BA}$ so $\overline{GA}$ is also parallel to $\overline{BA}$

I know that $\overleftrightarrow{BC}$ has the same slope everywhere because it is a line.

I know the angle that $\overline{BE}$ makes with $\overline{GE}$ must be the same as the angle that $\overline{EC}$ makes with $\overline{AC}$ since those 2 segments are parallel. So $\angle BEG \cong \angle ECD$. I think I can use that same argument for $\angle GBE \cong \angle DEC$.

I know that I now have an angle, a side, and an angle congruent to a corresponding angle, side, and angle. So $\Delta BGE \cong \Delta EDC$ by ASA.

14. Use Tehani's "I know" statements and her reasons to write a two-column proof that proves $\Delta BGE \cong \Delta EDC$. Begin your proof with the "givens" and what you are trying to prove.

Given: quadrilateral ADEG is a rectangle, $\overline{ED}$ bisects $\overline{AC}$
Prove: $\Delta BGE \cong \Delta EDC$

STATEMENTS	REASONS
1. quadrilateral ADEG is a rectangle	given
2. $\overline{ED}$ bisects $\overline{AC}$	given

Go

Topic: Transformations

Perform the following transformations on ΔABC. Use a straight edge to connect the corresponding points with a line segment. Answer the questions.

15. Reflect ΔABC over $\overleftrightarrow{JK}$. Label your new image $\Delta A'B'C'$.
16. What do you notice about the line segments $\overline{AA'}, \overline{BB'}, and\ \overline{CC'}$?
17. Compare line segments $\overline{AB}, \overline{BC}, and\ \overline{CA}$ to $\overline{A'B'}, \overline{B'C'}, \overline{C'A'}$. What is the same and what is different about these segments?
18. Translate ΔABC down 8 units and right 10 units. Label your new image $\Delta A''B''C''$.
19. What do you notice about the line segments $\overline{AA''}, \overline{BB''}, and\ \overline{CC''}$?
20. Compare line segments $\overline{AB}, \overline{BC}, and\ \overline{CA}$ to $\overline{A''B''}, \overline{B''C''}, \overline{C''A''}$. What is the same and what is different about these segments?
21. Translate ΔABC down 10 units and reflect it over the Y–axis. Label your new image $\Delta A'''B'''C'''$.
22. What do you notice about the line segments $\overline{AA'''}, \overline{BB'''}, and\ \overline{CC'''}$?
23. Compare line segments $\overline{AB}, \overline{BC}, and\ \overline{CA}$ to $\overline{A'''B'''}, \overline{B'''C'''}, \overline{C'''A'''}$. What is the same and what is different about these segments?