

Questions on 5.3 HW?

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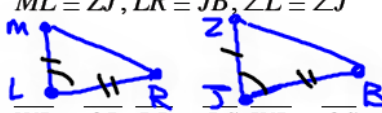
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Remember that when you write a congruence statement such as  $\triangle ABC \cong \triangle FGH$ , the corresponding parts of the two triangles must be the parts that are congruent. For instance,  $\angle A \cong \angle F$ ,  $\overline{AB} \cong \overline{FG}$ ,  $\angle B \cong \angle G$ ,  $\overline{BC} \cong \overline{GH}$ . 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.

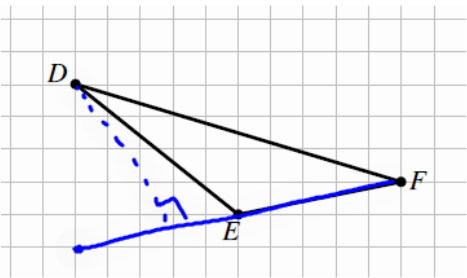
	Congruence statement	Congruence pattern
1. $\overline{ML} \cong \overline{ZJ}$ , $\overline{LR} \cong \overline{JB}$ , $\angle L \cong \angle J$	a. $\triangle RML \cong \triangle BZJ$	b. SAS
	a.	b.
2. $\overline{WB} \cong \overline{QR}$ , $\overline{BP} \cong \overline{RS}$ , $\overline{WP} \cong \overline{QS}$	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.

8.50 x 11.00 in

perpendicular bisector.

**Use  $\triangle DEF$  in problems 11 - 13.**

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



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Geometric Figures | 5.3

angle. So  $\triangle BGE \cong \triangle EDC$  by ASA.

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

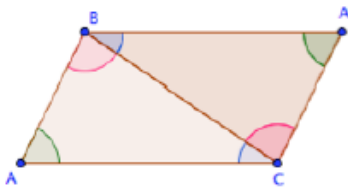
**Given:** quadrilateral ADEG is a rectangle,  $\overline{ED}$  bisects  $\overline{AC}$   
**Prove:**  $\triangle BGE \cong \triangle EDC$

STATEMENTS	REASONS
1. quadrilateral ADEG is a rectangle	given
2. $\overline{ED}$ bisects $\overline{AC}$	given
3. $\overline{BE} \cong \overline{EC}$	3. definition of bisect
4. $\overline{GE} \parallel \overline{AD}$	4. opposite sides in a rect. are $\parallel$

## 5.4 Parallelism Preserved and Protected

### *A Develop Understanding Task*

In a previous task, *How Do You Know That*, you were asked to explain how you knew that this figure, which was formed by rotating a triangle about the midpoint of one of its sides, was a parallelogram.



You may have found it difficult to explain how you knew that sides of the original triangle and its rotated image were parallel to each other except to say, "It just has to be so." There are always some statements we have to accept as true in order to convince ourselves that other things are true. We try to keep this list of statements as small as possible, and as intuitively obvious as possible. For example, in our work with transformations we have agreed that distance and angle measures are preserved by rigid motion transformations since our experience with these transformations suggest that sliding, flipping and turning figures do not distort the images in any way. Likewise, parallelism within a figure is preserved by rigid motion transformations: for example, if we reflect a parallelogram the image is still a parallelogram—the opposite sides of the new quadrilateral are still parallel.

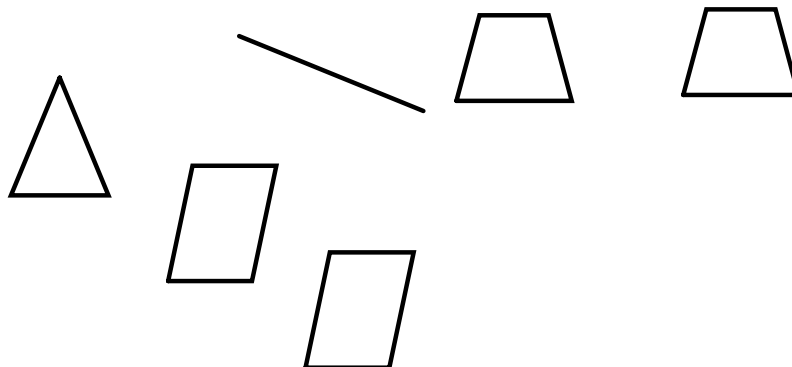
Mathematicians call statements that we accept as true without proof postulates. Statements that are supported by justification and proof are called theorems.

Knowing that lines or line segments in a diagram are parallel is often a good place from which to start a chain of reasoning. Almost all descriptions of geometry include a parallel postulate among the list of statements that are accepted as true. In this task we develop some parallel postulates for rigid motion transformations.

#### Translations

Under what conditions are the corresponding line segments in an image and its pre-image parallel after a translation? That is, which word best completes this statement?

After a sliding translation, corresponding line segments in an image and its pre-image are [never, sometime, always] parallel.



Give reasons for your answer. If you choose "sometimes", be very clear in your explanation how to tell when the corresponding line segments before and after the translation are parallel and when they are not.

As long as we have parallel lines to start with, those lines will always stay parallel as you translate the figure.

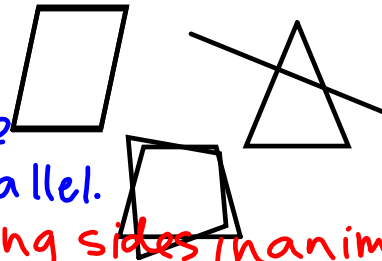
Rotations

Under what conditions are the corresponding line segments in an image and its pre-image parallel after a rotation? That is, which word best completes this statement?

After a rotation, corresponding line segments in an image and its pre-image are [never, sometimes, always] parallel.

Give reasons for your answer. If you choose "sometimes", be very clear in your explanation how to tell when the corresponding line segments before and after the rotation are parallel and when they are not.

If we have parallel lines to begin with, rotating the figure doesn't make the lines not parallel.



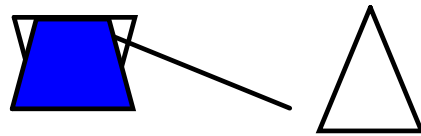
Reflections

Under what conditions are the corresponding line segments in an image and its pre-image parallel after a reflection? That is, which word best completes this statement?

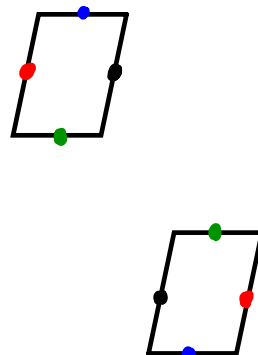
After a reflection, <sup>flip</sup> corresponding line segments in an image and its pre-image are [never, sometimes, always] parallel.

Give reasons for your answer. If you choose "sometimes" be very clear in your explanation how to tell when the corresponding line segments before and after the reflection are parallel and when they are not.

If we reflect a figure, parallel lines will stay parallel.



→ If we reflect a figure, the corresponding lines in the image & pre-image will sometimes be parallel.



Homework

Finish 5.4 "Ready, Set, Go"