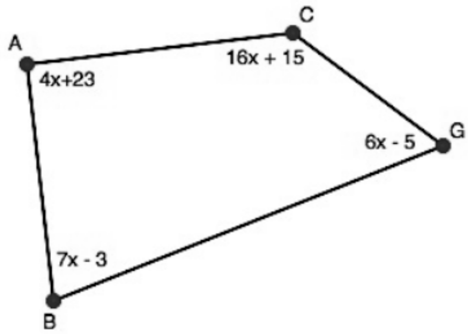
Questions on 5.5 HW?

Apr 8-8:30 AM

1. Use what you know about triangles to write a paragraph proof that proves that the sum of the angles in a quadrilateral is 360º.



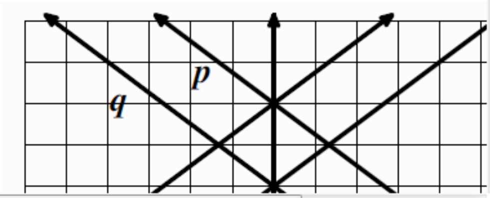
2. Find the measure of x in quadrilateral *ABGC*.

$4x+23+7x-3+6x-5+16x+15=360$

Match the equation with the correct line in the graph of lines *p*, *q*, *r*, and *s*.

3. $y=\frac{3}{4}x+2$

4. $y=-\frac{3}{4}x+2$



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Match the equation with the correct line in the graph of lines *p*, *q*, *r*, and *s*.

3. $y = \frac{3}{4}x + 2$

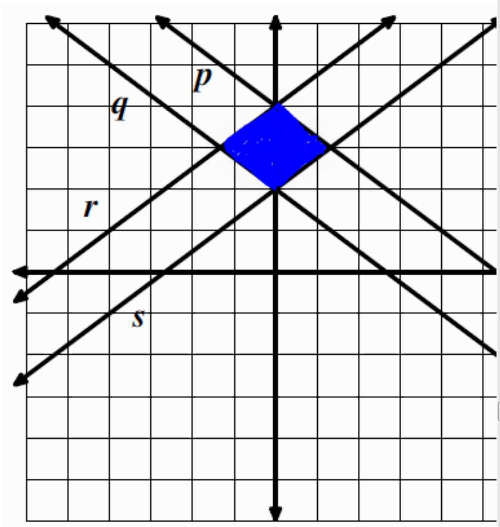
4. $y = -\frac{3}{4}x + 2$

5. $y = \frac{3}{4}x + 4$

6. $y = -\frac{3}{4}x + 4$

7. Describe the shape made by the intersection of the 4 lines. List as many observations as you can about the shape and its features.

rhombus, parallelogram, quadrilateral



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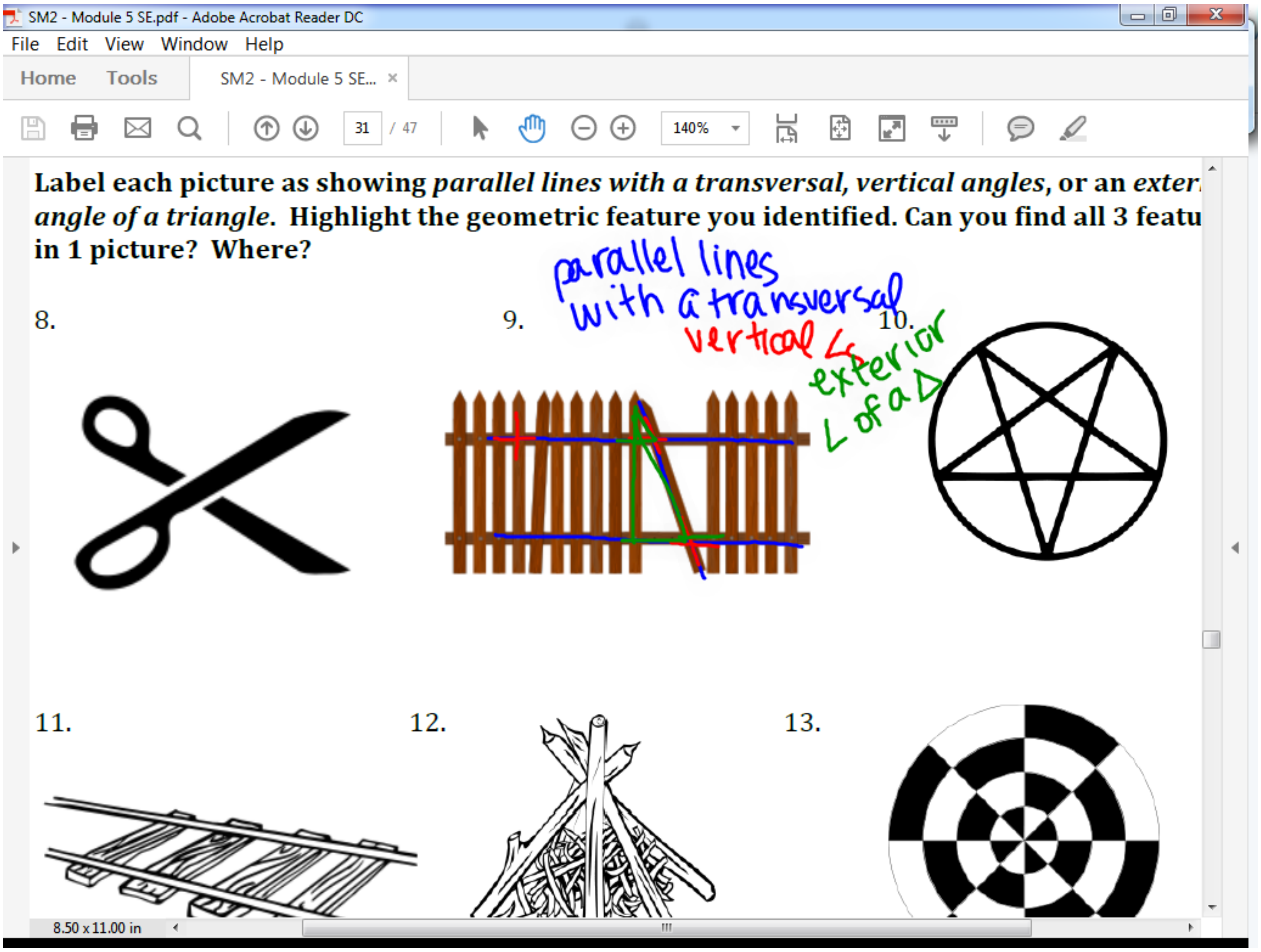

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Label each picture as showing *parallel lines with a transversal, vertical angles*, or an *exter[ior] angle of a triangle*. Highlight the geometric feature you identified. Can you find all 3 featu[res] in 1 picture? Where?

8.

9. parallel lines with a transversal

vertical ∠s

exterior ∠ of a △

10.

11.

12.

13.

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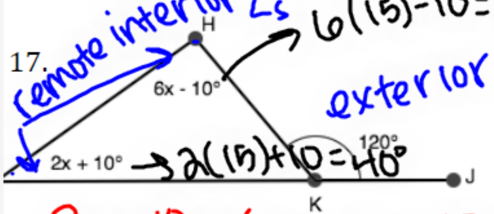
Find the value of the 2 remote interior angles in the figures below.

17.

remote interior ∠s

$6(15)-10=80°$

exterior



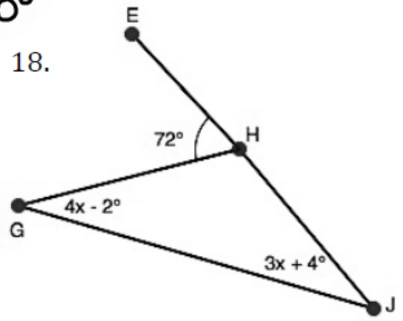
$\rightarrow 2(15)+10=40°$

$2x+10+6x-10=120$

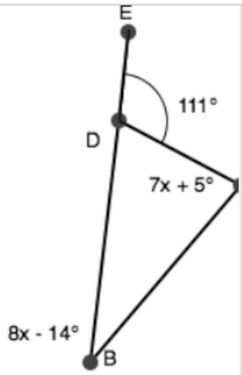
$\frac{8x}{8}=\frac{120}{8}$

$\boxed{x=15}$

18.



19.



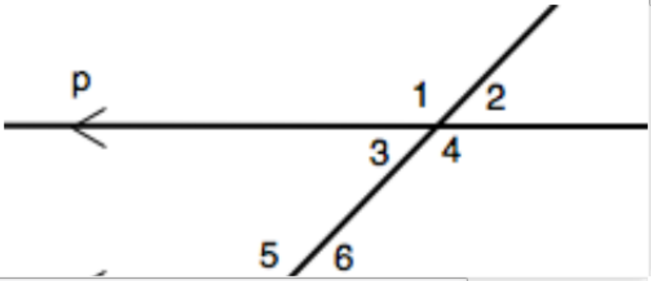
Indicate whether each pair of angles is *congruent* or *supplementary* by trusting how they look. Lines *p* and *q* are parallel.

20. ∠5 *and* ∠8

21. ∠2 *and* ∠6

22. ∠2 *and* ∠8

23. ∠4 *and* ∠6



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Indicate whether each pair of angles is *congruent* or *supplementary* by trusting how they look. Lines *p* and *q* are parallel.

20. $\angle 5$ *and* $\angle 8$ $\cong$ vertical $\angle$s

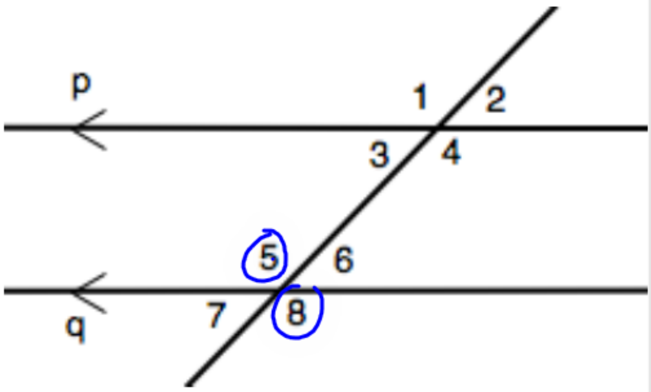
21. $\angle 2$ *and* $\angle 6$

22. $\angle 2$ *and* $\angle 8$

23. $\angle 4$ *and* $\angle 6$

24. $\angle 3$ *and* $\angle 5$

25. $\angle 1$ *and* $\angle 3$



Go

Topic: Complementary and supplementary angles.

Find the complement and the supplement of the given angles. It is possible for the complement or supplement not to exist.

8.50 x 11.00 in

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GO

Topic: Complementary and supplementary angles.

90° 180°

Find the complement and the supplement of the given angles. It is possible for the complement or supplement not to exist.

26. 37°

comp: $90-37=53°$

supp: $180-37=143°$

27. 59°

28. 89°

29. 111°

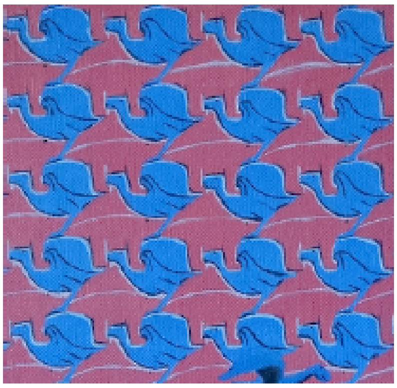
30. 3°

31. 90°

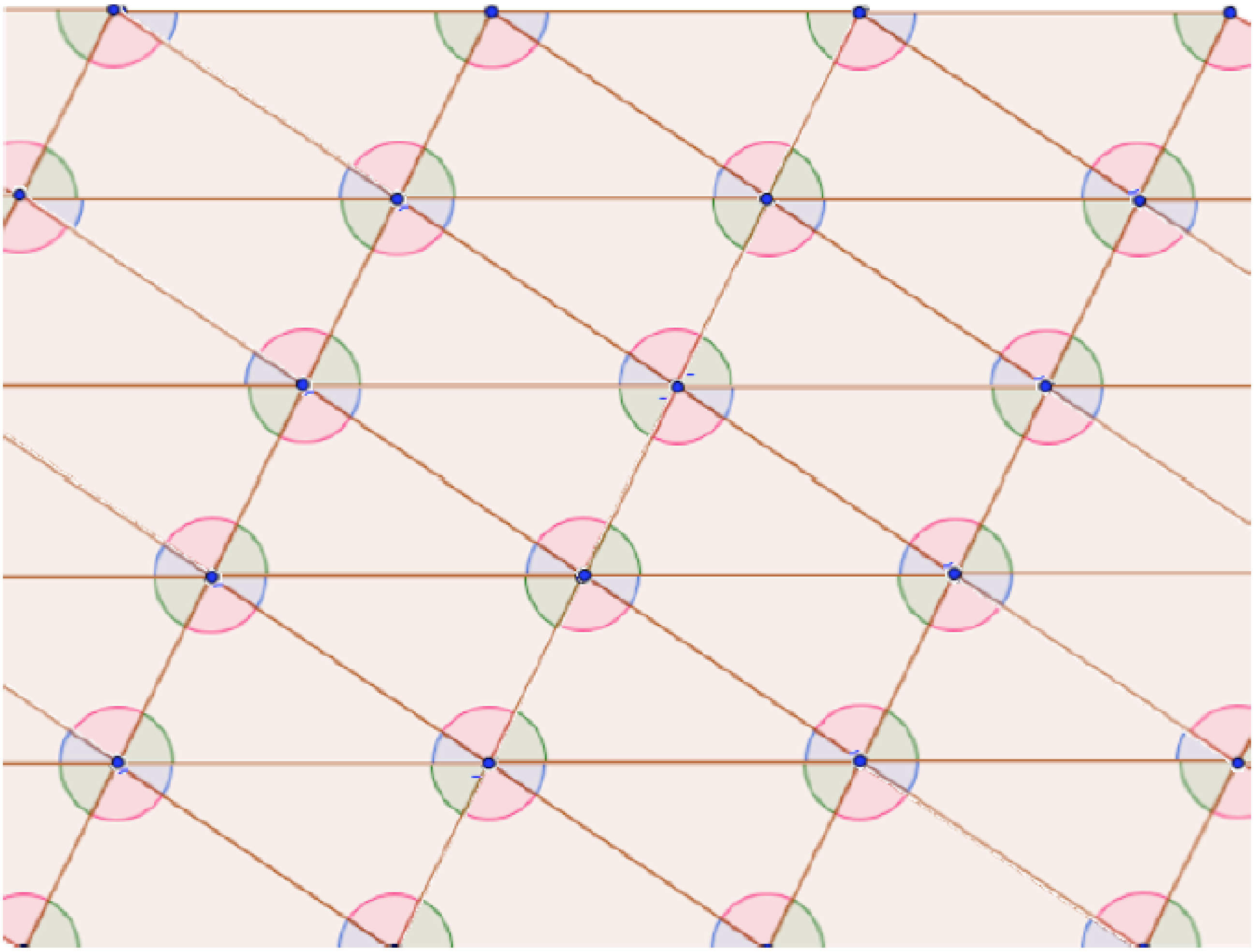
8.50 x 11.00 in

5.5 Conjectures and Proof

A Practice Understanding Task



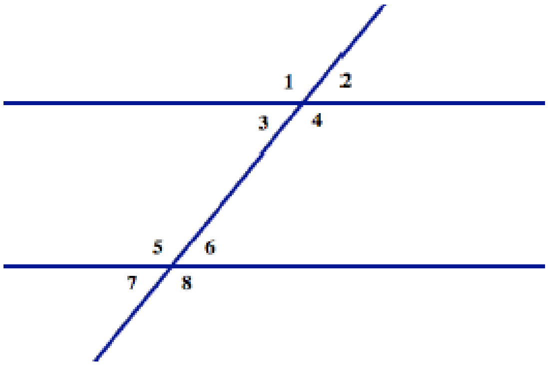
The diagram from *How Do You Know That?* has been extended by repeatedly rotating the image triangles around the midpoints of their sides to form a tessellation of the plane, as shown below.



Using this diagram, we will make some conjectures about lines, angles and triangles and then write proofs to convince ourselves that our conjectures are always true.

Parallel Lines Cut By a Transversal

When a line intersects two or more other lines, the line is called a *transversal* line. When the other lines are parallel to each other, some special angle relationships are formed. To identify these relationships, we give names to particular pairs of angles formed when lines are crossed (or cut) by a transversal. In the diagram below, ∠ and ∠ are called *corresponding angles*, ∠ and ∠ are called *alternate interior angles*, and ∠ and ∠ are called *same side interior angles*.



Examine the tessellation diagram above, looking for places where parallel lines are crossed by a transversal line.

Based on several examples of parallel lines and transversals in the diagram, write some conjectures about corresponding angles, alternate interior angles and same side interior angles.

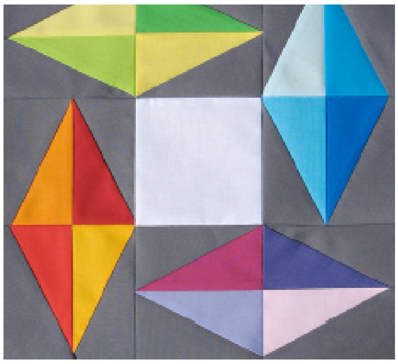
My conjectures:

Proving Our Conjectures

For each of the conjectures you wrote above, write a proof that will convince you and others that the conjecture is always true. You can use ideas about transformations, linear pairs, congruent triangle criteria, etc. to support your arguments. A good way to start is to write down everything you know in a flow diagram, and then identify which statements you might use to make your case.

5.6 Parallelogram Conjectures and Proof

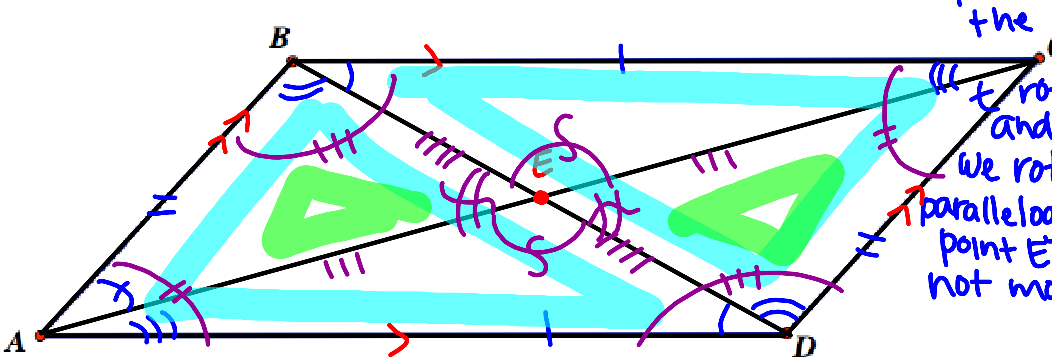
A Solidify Understanding Task



In Mathematics I you made conjectures about properties of parallelograms based on identifying lines of symmetry and rotational symmetry for various types of parallelograms. Now that we have additional knowledge about the angles formed when parallel lines are cut by a transversal, and we have criteria for convincing ourselves that two triangles are congruent, we can more formally prove some of the things we have noticed about parallelograms.

1. Explain how you would locate the center of rotation for the following parallelogram. What convinces you that the point you have located is the center of rotation?

point E is the center of rotation and when we rotate the parallelogram, point E does not move!



2. If you haven't already, draw one or both of the diagonals in the above parallelogram. Use this diagram to prove this statement: *opposite sides of a parallelogram are congruent*

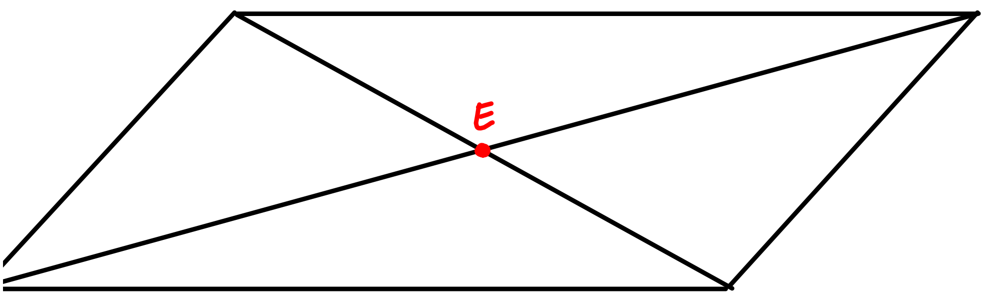
$\overline{BC} \cong \overline{AD}$, $\overline{AB} \cong \overline{DC}$ } $\triangle BCD \cong \triangle DAB$ by ASA and $\overline{BC} \cong \overline{DA}$ because they are corresponding sides of $\cong \triangle$.

3. Use this diagram to prove this statement: *opposite angles of a parallelogram are congruent*

$\angle B \cong \angle D$, $\angle A \cong \angle C$ } they are alternate interior angles when the parallel lines are cut by a transversal & are $\cong$.

4. Use this diagram to prove this statement: *the diagonals of a parallelogram bisect each other*

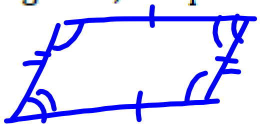
$\overline{AE} \cong \overline{CE}$, $\overline{BE} \cong \overline{DE}$ } $\triangle BAE \cong \triangle DCE$ by ASA $\triangle \cong$ and $\overline{AE}$ & $\overline{CE}$ are corresponding parts of $\cong \triangle$s and so are $\overline{BE}$ & $\overline{DE}$



The statements we have proved above extend our knowledge of properties of all parallelograms: not only are the opposites sides parallel, they are also congruent; opposite angles are congruent; and the diagonals of a parallelogram bisect each other. A parallelogram has 180° rotational symmetry around the point of intersection of the diagonals—the center of rotation for the parallelogram.

5. Consider the following statements. If you think the statement is true, create a diagram and write a convincing argument to prove the statement.

   a. If opposite sides and angles of a quadrilateral are congruent, the quadrilateral is a parallelogram.



   b. If opposite sides of a quadrilateral are congruent, the quadrilateral is a parallelogram.

   c. If opposite angles of a quadrilateral are congruent, the quadrilateral is a parallelogram.

   d. If the diagonals of a quadrilateral bisect each other, the quadrilateral is a parallelogram.

Homework

Finish 5.6 "Ready, Set, Go"