3.2 Start Thinking

Suppose you are given parallel lines ℓ and m, as well as line t, which intersects lines ℓ and m.

Sketch the lines and label angles 1 through 8 created by the intersections. What is the least number of angle measures you need to be given to figure out all eight angle measures? Explain.

3.2 Warm Up

Find the angle measure.

1. $(3x + 22)^\circ = (10x - 6)^\circ$

2. $(7x - 46)^\circ = (9x - 64)^\circ$

3. $(15x + 12)^\circ = (19x - 24)^\circ$

4. $(15x + 8)^\circ = (21x - 10)^\circ$

5. $(16x - 42)^\circ = (9x + 14)^\circ$

6. $(11x + 18)^\circ = (14x)^\circ$

3.2 Cumulative Review Warm Up

Sketch a diagram of the description.

1. plane R and line ℓ intersecting plane R at a 45° angle

2. $\overline{AB}$ in plane R bisected by point C, with point D also on $\overline{AB}$

3. $\overline{AB}$ in plane R with ray $\overrightarrow{CD}$ such that point C is on $\overline{AB}$

4. planes R and S with line $\overleftrightarrow{XY}$ intersecting each plane

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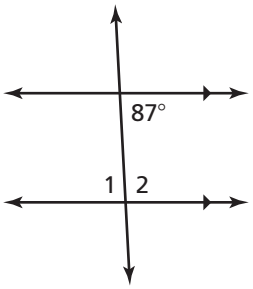
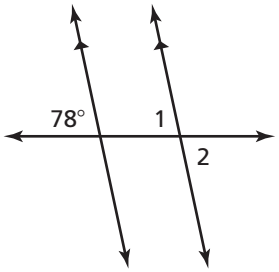
3.2 Practice A

In Exercises 1 and 2, find $m\angle 1$ and $m\angle 2$. Tell which theorem you used in each case.

1.

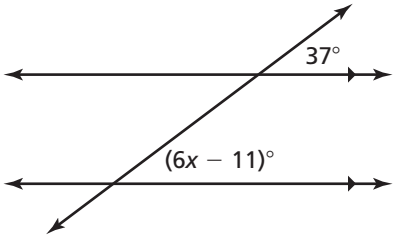


2.

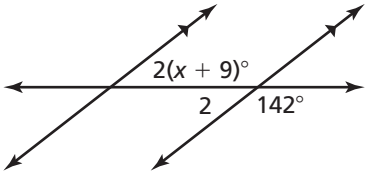


In Exercises 3 and 4, find the value of x. Show your steps.

3.

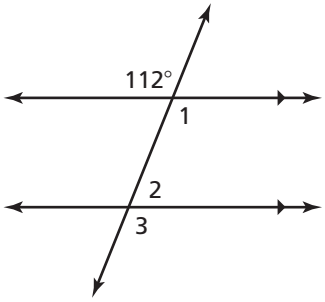


4.

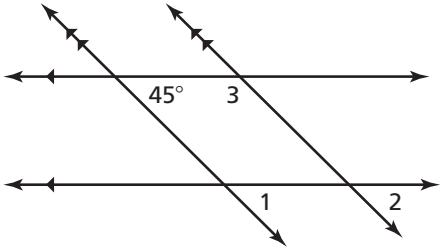


In Exercises 5 and 6, find $m\angle 1$, $m\angle 2$, and $m\angle 3$. Explain your reasoning.

5.

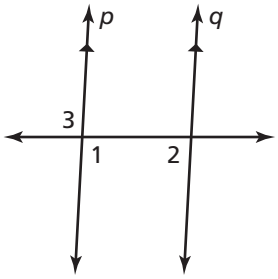


6.



7. Prove the Corresponding Angles Theorem (Thm. 3.1).

8. Prove that if $\angle 1 \cong \angle 2$, then $\angle 2 \cong \angle 3$. What is $m\angle 1$? Explain.



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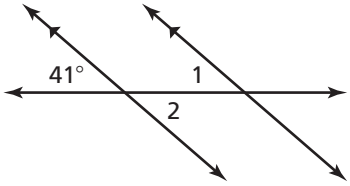
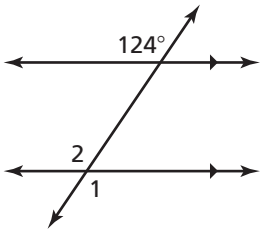
3.2 Practice B

In Exercises 1 and 2, find $m\angle 1$ and $m\angle 2$. Tell which theorem you used in each case.

1.

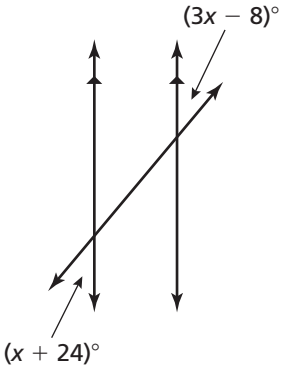


2.

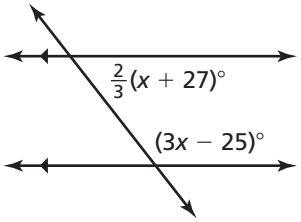


In Exercises 3 and 4, find the value of x. Show your steps.

3.

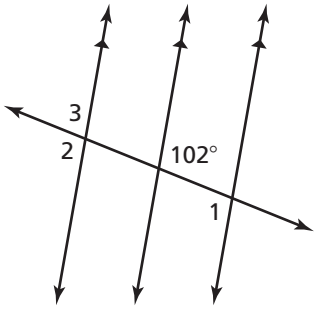


4.

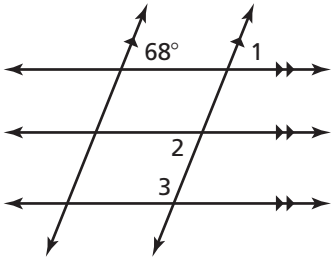


In Exercises 5 and 6, find $m\angle 1$, $m\angle 2$, and $m\angle 3$. Explain your reasoning.

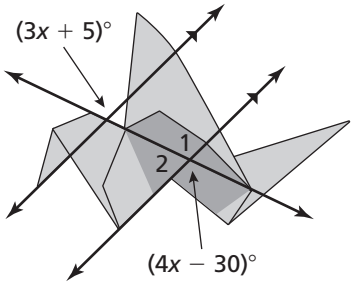
5.



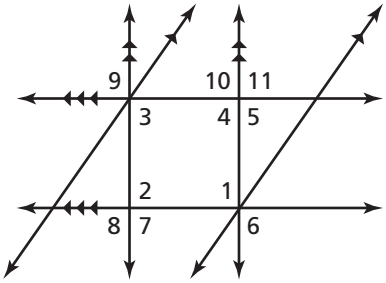
6.



7. The figure shows a two-dimensional representation of a bird made out of origami paper. Find $m\angle 1$ and $m\angle 2$. Explain your reasoning.



8. The figure shows three pairs of parallel lines. Which angles are congruent to $\angle 1$? Tell which theorem you used in each case.



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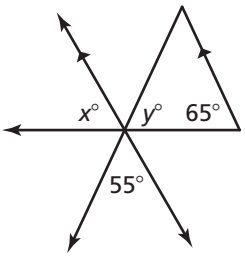
3.2 Enrichment and Extension

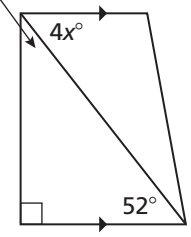
Parallel Lines and Transversals

In Exercises 1 and 2, find the values of *x* and *y*.

1.



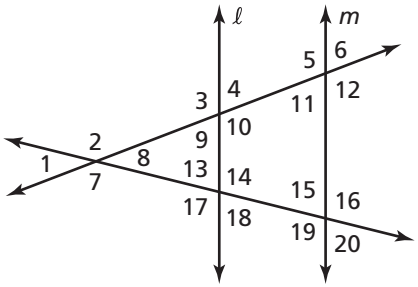
2. $(3y + 2)°$



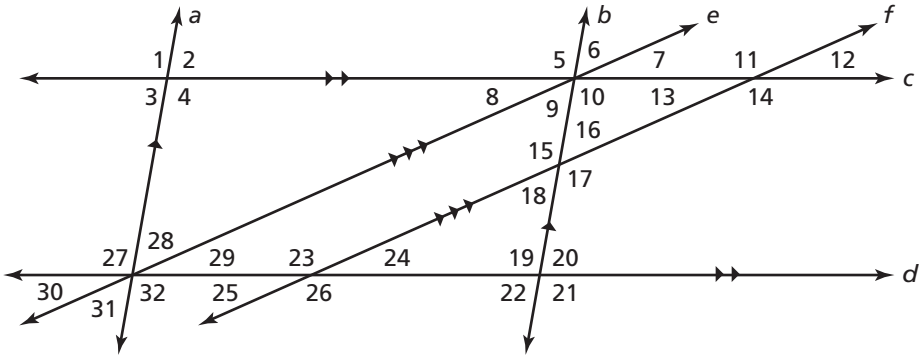
3. Draw a four-sided figure in which $\overline{AB} \parallel \overline{DC}$ and $\overline{AD} \parallel \overline{BC}$. Prove $\angle A \cong \angle C$.

In Exercises 4 and 5, find the measures of all angles in the diagram.

4. **Given:** $\ell \parallel m$, $m\angle 1 = 35°$, and $m\angle 12 = 111°$



5. **Given:** $a \parallel b$, $c \parallel d$, $e \parallel f$, $m\angle 7 = 24°$, and $m\angle 20 = 80°$



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3.2 Puzzle Time

What Did The Acorn Say When It Grew Up?

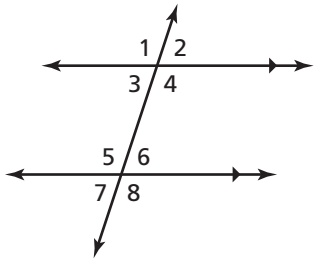
Circle the letter of each correct answer in the boxes below. The circled letters will spell out the answer to the riddle.

Complete the sentence.

1. If two parallel lines are cut by a transversal, then the pairs of consecutive interior angles are _____.
2. If two parallel lines are cut by a transversal, then the pairs of alternate interior angles are _____.

Using the properties of parallel lines, find the angle measure.

3. $m\angle 2 = 74°$; Find $m\angle 1$.
4. $m\angle 2 = 74°$; Find $m\angle 3$.
5. $m\angle 1 = 114°$; Find $m\angle 8$.
6. $m\angle 4 = 56°$; Find $m\angle 6$.
7. $m\angle 1 = 84°$; Find $m\angle 7$.
8. $m\angle 8 = 116°$; Find $m\angle 2$.



G	E	I	F	O	A	E	M
64°	124°	116°	66°	106°	transitive	complementary	congruent
T	**E**	**I**	**T**	**R**	**Y**	**M**	**E**
84°	74°	34°	96°	114°	supplementary	56°	116°