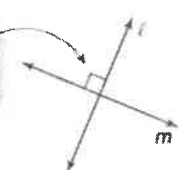
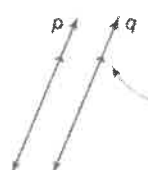
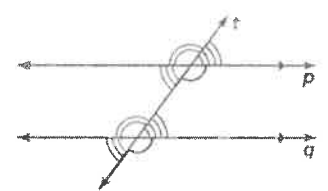
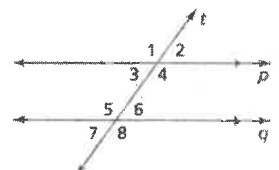
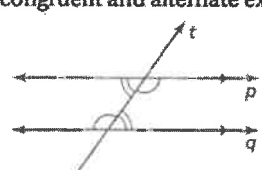
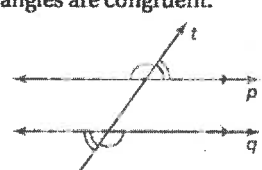
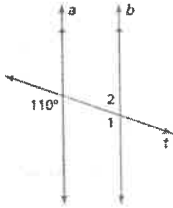
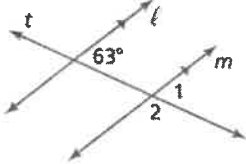
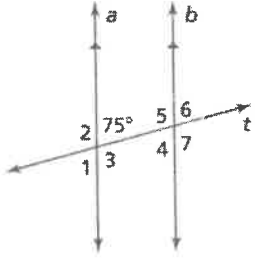
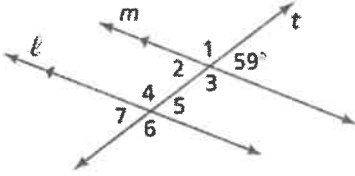


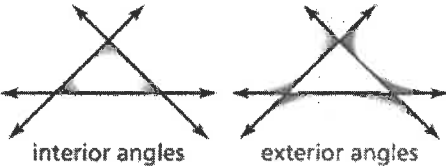
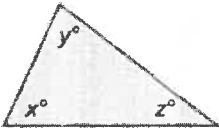



<p>Chapter 3 Pre-Algebra</p>	<p>Angles and Triangles</p>
<p>MAFS.8.G.1 MAFS.8.G.1.5</p>	<p>Understand congruence and similarity using physical models, transparencies, and geometry software. Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angle created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.</p>
<p>Essential Question</p>	<p>How can you describe angles formed by parallel lines and transversals? In this lesson, I will identify the angles formed when parallel lines are cut by a transversal and I will find missing angle measures.</p>
<p>3.1 Parallel Lines and Transversals</p>	<p>Lines in the same plane that do not intersect are called <i>parallel lines</i>. Lines that intersect at right angles are called <i>perpendicular lines</i>.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid gray; padding: 5px; border-radius: 10px;">Indicates lines l and m are perpendicular.</div>  <div style="border: 1px solid gray; padding: 5px; border-radius: 10px;">Indicates lines p and q are parallel.</div> </div>  <p>A line that intersects two or more lines is called a transversal. When parallel lines are cut by a transversal, several pairs of congruent angles are formed.</p> <p>Corresponding Angles When a transversal intersects parallel lines, corresponding angles are congruent.</p>  <p style="text-align: center;">Corresponding angles</p> <p>When two parallel lines are cut by a transversal, four interior angles are formed on the inside of the parallel lines and four exterior angles are formed on the outside of the parallel lines.</p> <p>$\angle 3, \angle 4, \angle 5,$ and $\angle 6$ are interior angles. $\angle 1, \angle 2, \angle 7,$ and $\angle 8$ are exterior angles.</p>  <p>Alternate Interior Angles and Alternate Exterior Angles When a transversal intersects parallel lines, alternate interior angles are congruent and alternate exterior angles are congruent.</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Alternate interior angles</p> </div> <div style="text-align: center;">  <p>Alternate exterior angles</p> </div> </div>

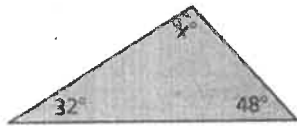
<p>Example 1 Finding Angle Measures</p>	 <p>Use the figure to find the measures of (a) $\angle 1$ and (b) $\angle 2$.</p>
<p>On Your Own</p>	<p>Use the figure to find the measure of the angle. Explain your reasoning.</p> <p>1. $\angle 1$ 2. $\angle 2$</p> 
<p>Example 2 Using Corresponding Angles</p>	<p>Use the figure to find the measures of the numbered angles.</p> 
<p>On Your Own</p>	<p>3. Use the figure to find the measures of the numbered angles.</p> 
<p>Example 3 Using Corresponding Angles</p>	<p>A store owner uses pieces of tape to paint a window advertisement. The letters are slanted at an 80° angle. What is the measure of $\angle 1$?</p> <p>(A) 80° (B) 100° (C) 110° (D) 120°</p> 
<p>On Your Own</p>	<p>4. WHAT IF? In Example 3, the letters are slanted at a 65° angle. What is the measure of $\angle 1$?</p>

<p>Example 4</p> <p>Identifying Alternate Interior and Alternate Exterior Angles</p>	 <p>The photo shows a portion of an airport. Describe the relationship between each pair of angles.</p> <p>a. $\angle 3$ and $\angle 6$</p> <p>b. $\angle 2$ and $\angle 7$</p>
<p>On Your Own</p>	<p>In Example 4, the measure of $\angle 4$ is 84°. Find the measure of the angle. Explain your reasoning.</p> <p>5. $\angle 3$ 6. $\angle 5$ 7. $\angle 6$</p>
<p>Essential Question</p>	<p>How can you describe the relationships among the angles of a triangle?</p> <p>In this lesson, I will understand that the sum of the interior angle measures of a triangle is 180 degrees, and I will find the measures of interior and exterior angles of triangles.</p>
<p>3.2</p> <p>Angles of Triangles</p>	<p>The angles inside a polygon are called interior angles. When the sides of a polygon are extended, other angles are formed. The angles outside the polygon that are adjacent to the interior angles are called exterior angles.</p>  <p>Interior Angle Measures of a Triangle</p> <p>Words The sum of the interior angle measures of a triangle is 180°.</p> <p>Algebra $x + y + z = 180$</p>  <p>Exterior Angle Measures of a Triangle</p> <p>Words The measure of an exterior angle of a triangle is equal to the sum of the measures of the two nonadjacent interior angles.</p> <p>Algebra $z = x + y$</p> 

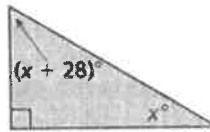
Example 1
Using Interior Angle Measures

Find the value of x .

a.



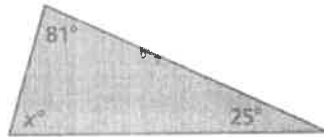
b.



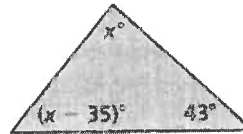
On Your Own

Find the value of x .

1.



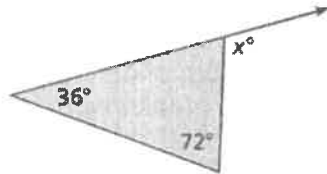
2.



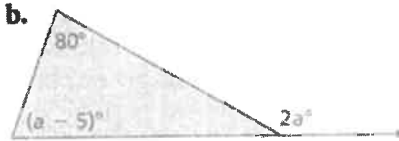
Example 2
Finding Exterior Angle Measures

Find the measure of the exterior angle.

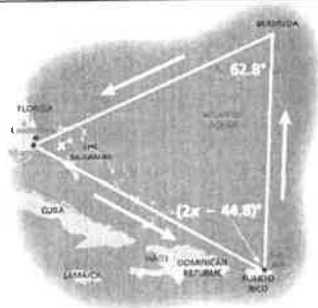
a.



b.



Example 3
Real Life Application



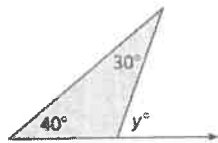
An airplane leaves from Miami and travels around the Bermuda Triangle. What is the value of x ?

- (A) 26.8 (B) 27.2 (C) 54 (D) 64

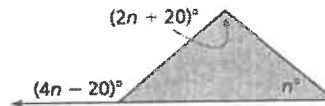
On Your Own

Find the measure of the exterior angle.

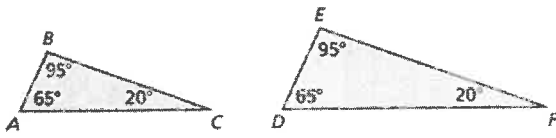
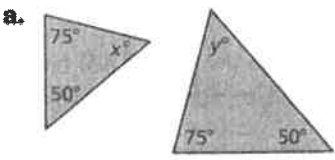
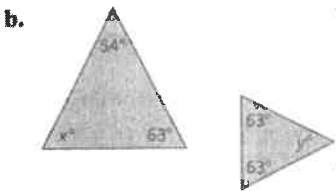
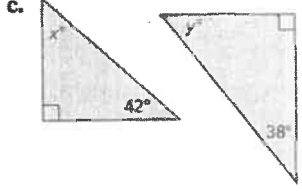
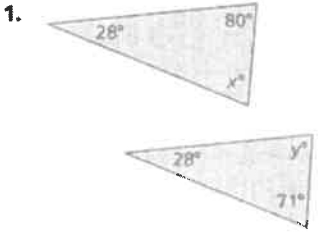
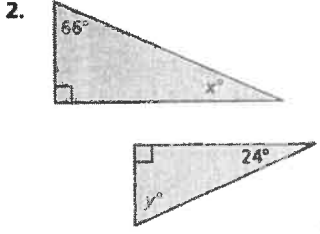
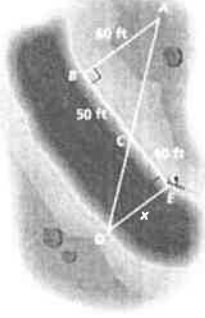
3.



4.

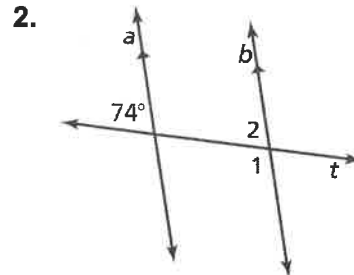
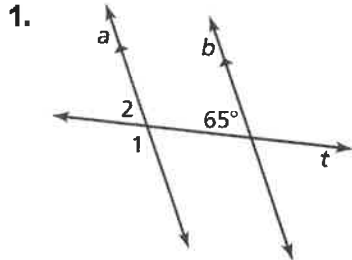


5. In Example 3, the airplane leaves from Fort Lauderdale. The interior angle measure at Bermuda is 63.9° . The interior angle measure at San Juan is $(x + 7.5)^\circ$. Find the value of x .

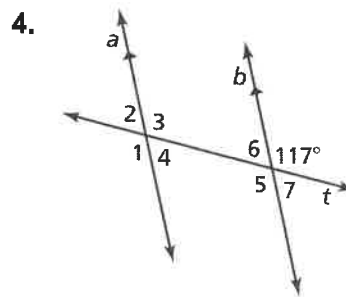
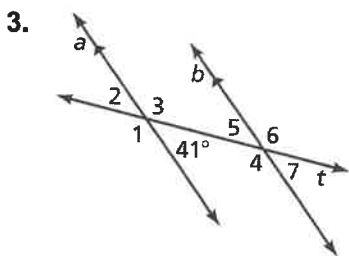
<p>Essential Question</p>	<p>How can you use angles to tell whether triangles are similar?</p> <p>In this lesson, I will understand the concept of similar triangles, identify similar triangles, and use indirect measurement to find missing measures.</p>
<p>3.4</p> <p>Using Similar Triangles</p>	<p>Angles of Similar Triangles</p> <p>Words When two angles in one triangle are congruent to two angles in another triangle, the third angles are also congruent and the triangles are similar.</p> <p>Example</p>  <p>Triangle ABC is similar to Triangle DEF: $\triangle ABC \sim \triangle DEF$.</p> <p>Indirect measurement uses similar figures to find a missing measure when it is difficult to find directly.</p>
<p>Example 1</p> <p>Identifying Similar Triangles</p>	<p>Tell whether the triangles are similar. Explain.</p> <p>a. </p> <p>b. </p> <p>c. </p>
<p>On Your Own</p>	<p>Tell whether the triangles are similar. Explain.</p> <p>1. </p> <p>2. </p>
<p>Example 2</p>	 <p>You plan to cross a river and want to know how far it is to the other side. You take measurements on your side of the river and make the drawing shown. (a) Explain why $\triangle ABC$ and $\triangle DEC$ are similar. (b) What is the distance x across the river?</p>
<p>On Your Own</p>	<p>3. WHAT IF? The distance from vertex A to vertex B is 55 feet. What is the distance across the river?</p>

3.1 Practice A

Use the figure to find the measures of the numbered angles.

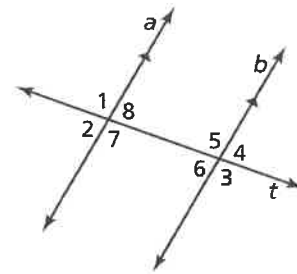


Use the figure to find the measures of the numbered angles. Explain your reasoning.



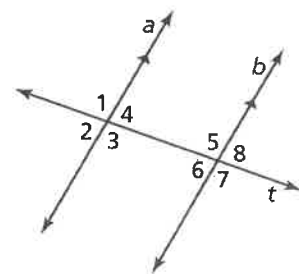
Complete the statement. Explain your reasoning.

- If the measure of $\angle 1 = 160^\circ$, then the measure of $\angle 5 = \underline{\quad ? \quad}$.
- If the measure of $\angle 6 = 37^\circ$, then the measure of $\angle 4 = \underline{\quad ? \quad}$.
- If the measure of $\angle 8 = 82^\circ$, then the measure of $\angle 3 = \underline{\quad ? \quad}$.
- If the measure of $\angle 4 = 60^\circ$, then the measure of $\angle 5 = \underline{\quad ? \quad}$.



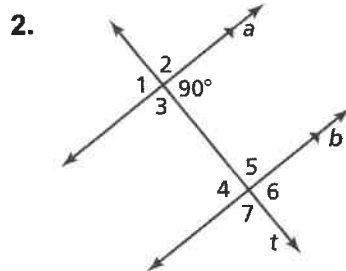
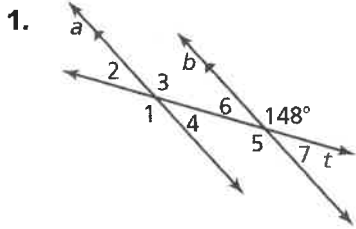
Correct the following statements about the numbered angles by replacing the underlined words with the correct words.

- $\angle 2$ is congruent to $\angle 4$. $\angle 4$ is congruent to $\angle 8$.
So, $\angle 2$ is supplementary to $\angle 8$.
- $\angle 6$ is congruent to $\angle 3$. $\angle 3$ is congruent to $\angle 1$.
So, $\angle 6$ is congruent to $\angle 1$.



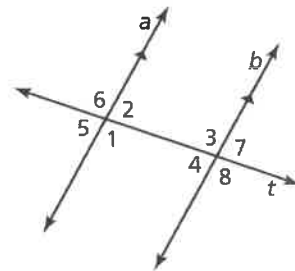
3.1 Practice B

Use the figure to find the measures of the numbered angles. Explain your reasoning.



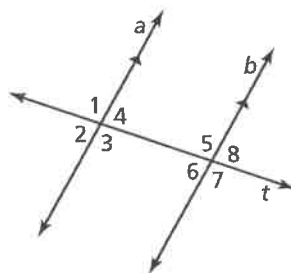
Complete the statement. Explain your reasoning.

3. If the measure of $\angle 1 = 130^\circ$, then the measure of $\angle 8 = \underline{\quad ? \quad}$.
4. If the measure of $\angle 5 = 53^\circ$, then the measure of $\angle 3 = \underline{\quad ? \quad}$.
5. If the measure of $\angle 7 = 71^\circ$, then the measure of $\angle 3 = \underline{\quad ? \quad}$.
6. If the measure of $\angle 4 = 65^\circ$, then the measure of $\angle 6 = \underline{\quad ? \quad}$.



Using the diagram for angle placement only (the measurement of the angles may change), indicate if the following statements are *always*, *sometimes*, or *never* true. Explain.

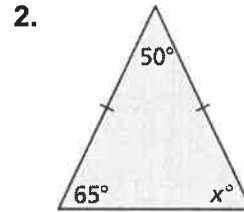
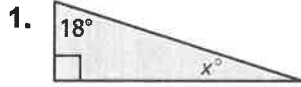
7. $\angle 1$ is congruent to $\angle 3$.
8. $\angle 6$ is supplementary to $\angle 8$.
9. $\angle 2$ is complementary to $\angle 1$.
10. $\angle 8$ and $\angle 5$ are vertical angles.
11. $\angle 2$ is congruent to $\angle 8$.



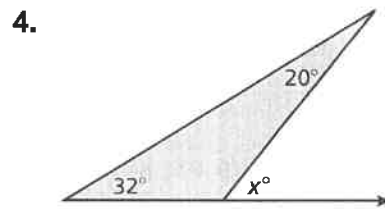
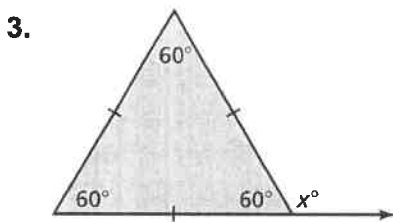
12. If a transversal intersects two parallel lines, is it possible for all of the angles formed to be acute angles? Explain.

3.2 Practice A

Find the measures of the interior angles.



Find the measure of the exterior angle.

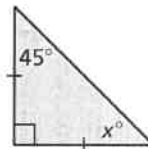
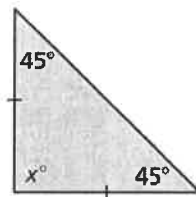
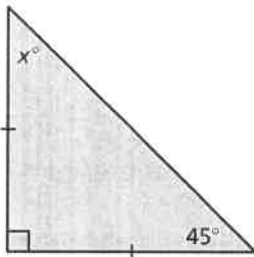


Tell whether a triangle can have the given angle measures. If not, change the first angle measure so that the angle measures form a triangle.

5. $36.9^\circ, 110.4^\circ, 33.7^\circ$

6. $62^\circ, 44\frac{3}{4}^\circ, 73\frac{1}{4}^\circ$

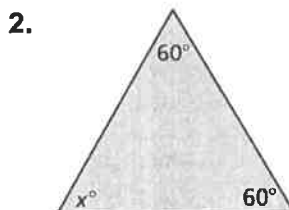
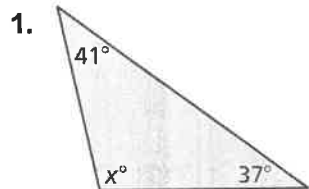
7. Consider the three isosceles right triangles.



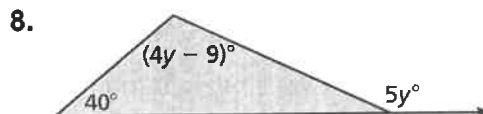
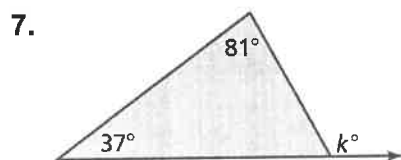
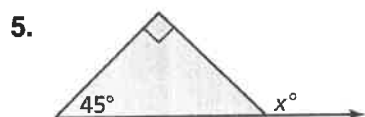
- Find the value of x for each triangle.
- What do you notice about the interior angle measures of each triangle?
- Write a rule about the interior angle measures of an isosceles right triangle.

3.2 Practice B

Find the measures of the interior angles.



Find the measure of the exterior angle.

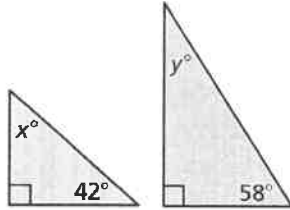


9. The ratio of the interior angle measures of a triangle is 1 : 4 : 5. What are the angle measures?
10. A right triangle has a exterior angles with a measure of 160°. Can you determine the measures of the interior angles? Explain.

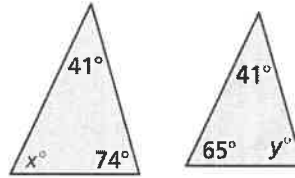
3.4 Practice A

Tell whether the triangles are similar. Explain.

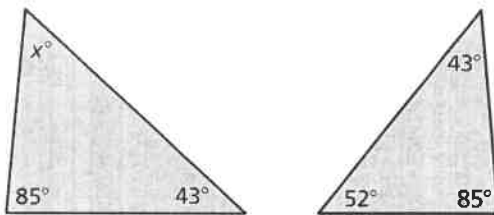
1.



2.



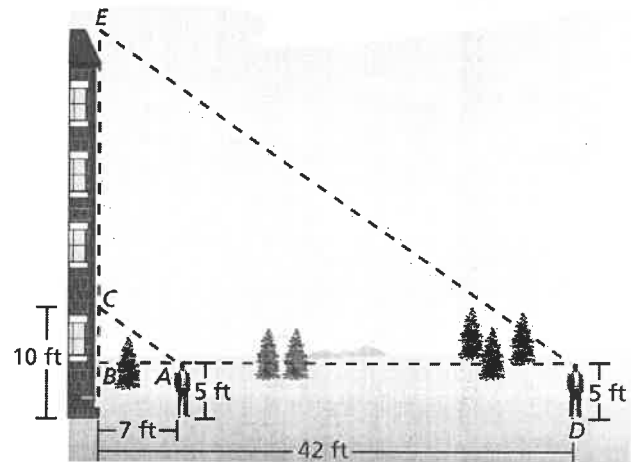
3. The triangles are similar. Find the value of x .



4. You can use indirect measurement to estimate the height of a building. First measure your distance from the base of the building and the distance from the ground to a point on the building that you are looking at. Maintaining the same angle of sight, move back until the top of the building is in your line of sight.

a. Explain why $\triangle ABC$ and $\triangle DBE$ are similar.

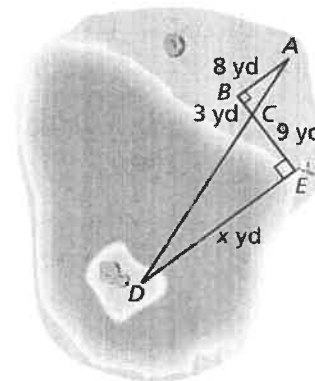
b. What is the height of the building?



5. You and your friend are practicing for a rowing competition and want to know how far it is to an island in the Indian River Lagoon. You take measurements on your side of the lagoon and make the drawing shown.

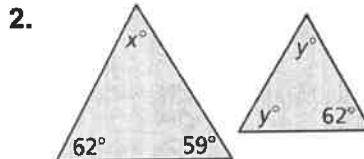
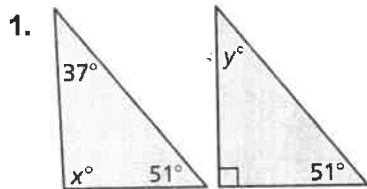
a. Explain why $\triangle ABC$ and $\triangle DEC$ are similar.

b. What is the distance to the island?



3.4 Practice B

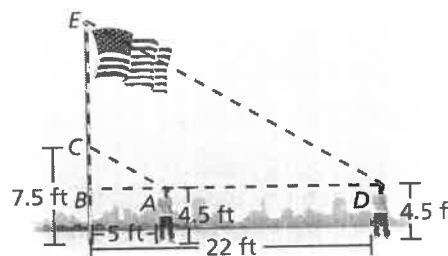
Tell whether the triangles are similar. Explain.



3. The triangles are similar. Find the value of x .



4. You can use indirect measurement to estimate the height of a flag pole. First measure your distance from the base of the flag pole and the distance from the ground to a point on the flag pole that you are looking at. Maintaining the same angle of sight, move back until the top of the flag pole is in your line of sight.



- Explain why $\triangle ABC$ and $\triangle DBE$ are similar.
- What is the height of the flag pole?

5. You are on a boat in the ocean, at Point A . You locate a lighthouse at Point D , beyond the line of sight of the marker at point C . You drive 0.2 mile west to Point B and then 0.1 mile south to Point C . You drive 0.3 mile more to arrive at Point E , which is due east of the lighthouse.

- Explain why $\triangle ABC$ and $\triangle DEC$ are similar.
- What is the distance from Point E to the lighthouse?

