

Lesson 12.3: Triangles



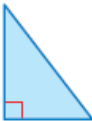

Essential Question

How can you construct triangles?

Key Ideas

It isn't possible for a triangle to have more than one obtuse angle.



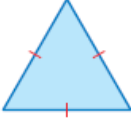
Classifying Triangles Using Angles

<p><i>acute</i> triangle</p>  <p>all acute angles</p>	<p><i>obtuse</i> triangle</p>  <p>1 obtuse angle</p>	<p><i>right</i> triangle</p>  <p>1 right angle</p>	<p><i>equiangular</i> triangle</p>  <p>3 congruent angles</p>
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All equiangular triangles are acute, but not all acute triangles are equiangular.

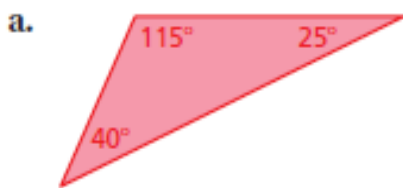
Classifying Triangles Using Sides

Congruent sides have the same length.

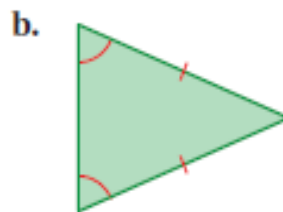
<p><i>scalene</i> triangle</p>  <p>no congruent sides</p>	<p><i>isosceles</i> triangle</p>  <p>at least 2 congruent sides</p>	<p><i>equilateral</i> triangle</p>  <p>3 congruent sides</p>
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The dashes on the sides and curves in the angles tell you which ones (if any) are congruent. No dashes/curves = no congruency.

Classify each triangle.



Obtuse scalene triangle

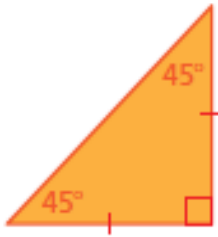


Acute isosceles triangle

***A triangle's angles *always* have a sum of 180 degrees.

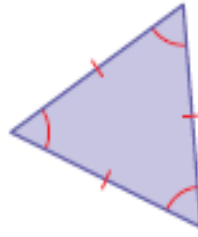
Classify the triangle.

1.



Right isosceles triangle

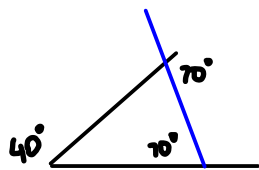
2.



Equiangular equilateral triangle

Work with a partner. Two angle measures of a triangle are given. Draw the triangle. What is the measure of the third angle? Compare your results with those of others in your class.

a. $40^\circ, 70^\circ$



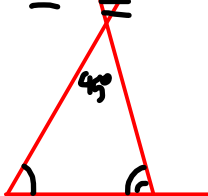
Begin by drawing a 40° angle.

Then, draw a 70° angle at the other end.

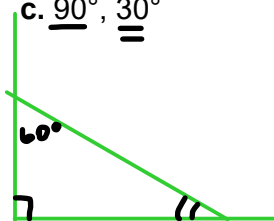
Extend the angles so that they meet and form a third angle.

Use your protractor to find the third angle measure.

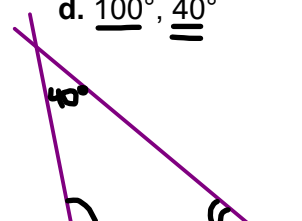
b. $60^\circ, 75^\circ$



c. $90^\circ, 30^\circ$

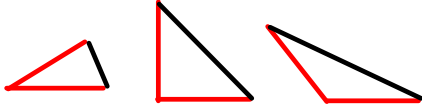


d. $100^\circ, 40^\circ$



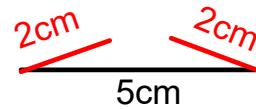
Construct a triangle with the given description.

1. side lengths: 2 cm, 2 cm



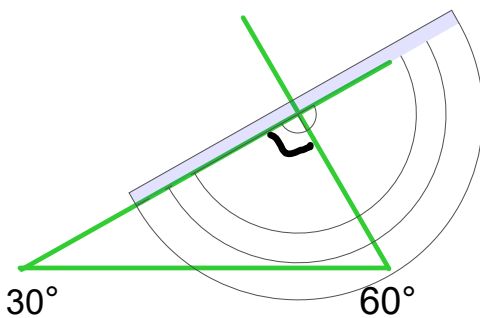
We aren't given any requirements related to the angles or the 3rd side length, so any of these triangles work.

The 3rd side must be $< 4\text{cm}$. If the 3rd side was 4cm , we would have a straight line. If the 3rd side was $> 4\text{cm}$, the other 2 sides would not meet.



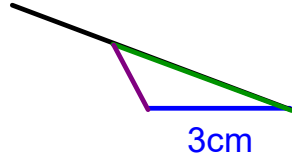
Draw a triangle with angle measures of 30° , 60° , and 90° .

Then classify the triangle. ***The angles can be drawn in any order.

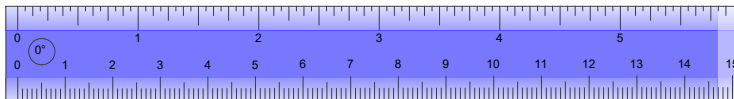


If we draw the 30° and 60° angles first, we can double check our work with a protractor and confirm that the 3rd angle is 90° .

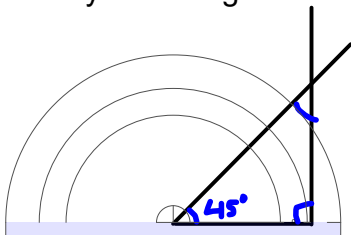
Draw a triangle with a 3-centimeter side and a 4-centimeter side that meet at a 20° angle. Then classify the triangle.



First, draw the 3cm side. Then, draw a 20° angle. Measure 4cm past the 20° angle. Connect the sides.



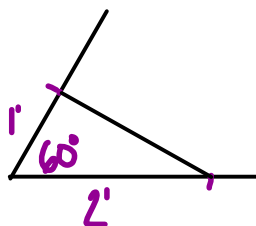
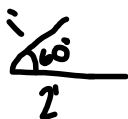
3. Draw a triangle with angle measures of 45° , 45° , and 90° . Then classify the triangle.



Right isosceles

The order in which you draw the angles doesn't matter. Draw 2 angles and the third will automatically be correct.

4. Draw a triangle with a 1-inch side and a 2-inch side that meet at a 60° angle. Then classify the triangle.



Right scalene

Start by sketching so that you know how the parts relate to each other.

Draw a 60° angle, measure the sides of the angle and connect them.