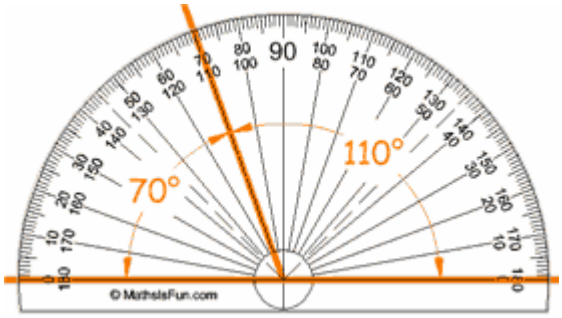
A Union of Professionals
Common Core
State Standards

Dear Parents and Caregivers,

In our letter about the basic geometric concepts that fourth graders are learning, one of the important ideas was that of ***angles***. In this letter we will look more closely at measuring angles and the part they play in identifying some ***triangles***. As students move into middle and high school, understanding angles will play an increasingly important role in mathematics.

Measuring Angles

Students have learned that angles are formed when two ***rays*** have a common endpoint. Angles are measured in ***degrees***, which are written with the symbol (°). For example, all circles have 360°. The number of degrees of a circle that are between the two rays tells the measure of the angle. To aid understanding, think of a clock face and picture lines drawn from 12 to 6 and from 9 to 3. This divides the circle into four parts. There are 90° between 12 and 3, between 3 and 6, between 6 and 9, and between 9 and 12. That adds up to 360°. Remember from the introduction of angles that some angles are called ***right angles***. When the clock hands are precisely on 12 and 3, 3 and 6, and so on, they form right angles. In fourth grade, students will learn to use a ***protractor*** to measure angles.



In the picture at the left, the bold orange lines form two angles. The base line of the angles matches precisely with the zeros on the protractor. One zero is on the inner set of numbers, one on the outer set. Follow the other line of the angle to the numbers (70 and 110). Protractors usually have two sets of numbers going in opposite directions from 90.

Be careful which angle you use! The angle on the left is smaller than a right angle: it is 70°. The angle on the right is greater than a right angle: it is 110°. Students should use this 90° ***benchmark*** when measuring angles. When in doubt, think "*Should this angle be larger or smaller than 90°?*"

Classifying Triangles Using Angle Measures

Additionally, your child will learn the different kinds of triangles based on the measures of their angles. An ***acute triangle*** is a triangle with three acute angles (less than 90°). If all three acute angles have the same measures, then it is called an ***equiangular*** triangle. An ***obtuse triangle*** is a triangle with one obtuse angle.

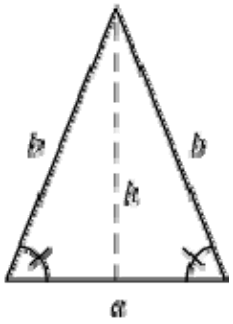
Family support: Students often enjoy playing detective. They can investigate whether certain things are possible or not as they learn geometry. Your child can use drawings or reasoning to think about these questions and explain the findings to you.

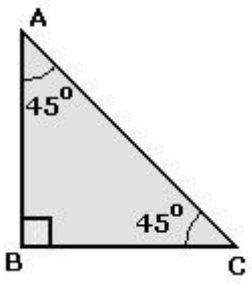
- Is it possible to have more than one obtuse angle in a triangle? Why or why not? (*No. Two obtuse angles add up to more than 180; triangles only have 180°.*)
- A ***right triangle*** is a triangle with one right angle. Is it possible to have a triangle with more than one right angle? Why or why not? (*No. If two angles measure 180° together, you cannot make the third angle.*)
- Can a triangle that is obtuse be a right triangle, too? (*No. Once again, an obtuse and a right angle would add up to more than 180°.*)

If a child answers yes to any of these questions ask him/her to show you an example.

Triangles and length of sides

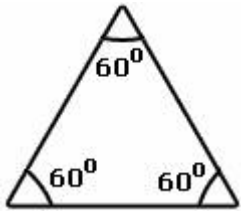
Moreover, students will learn to classify triangles and other polygons according to the lengths of the sides. Specifically, a triangle is called ***isosceles*** when two of its sides have the same lengths. Two sides measure *b* and one measures *a.* This also results in two angles being equal. It is also possible to have an isosceles right triangle. *See the diagram.*





Isosceles Triangle Right Isosceles Triangle

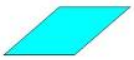
A triangle is called ***equilateral*** if all the sides have the same lengths and **equiangular** if all the angles are the same. (This requires three angles to each be 60°. For example, 3 x 60 = 180°). An equilateral triangle is also equiangular. It is *not* possible to have an equiangular right triangle because you cannot have three right angles in a triangle!

Equilateral  Equiangular

_____,
Fourth grade teacher

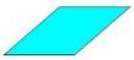
Show What You Know about Geometry!

Describe properties of these quadrilaterals and triangles by writing the correct numbers:

Polygon	Number of right angles	Number of pairs of parallel sides	Corners where perpendicular line segments meet	Number of acute angles	Number of obtuse angles	Pairs of equal sides (length)
Square 						
Rectangle 						
Trapezoid 						
Rhombus 						
Right Triangle 						
Isosceles Triangle 						

ANSWER SHEET: Show What You Know about Geometry!

Describe properties of these quadrilaterals and triangles by writing the correct numbers:

Polygon	Number of right angles	Number of pairs of parallel sides	Corners where perpendicular line segments meet	Number of acute angles	Number of obtuse angles	Pairs of equal sides (length)
Square 	4	2	4	0	0	2
Rectangle 	4	2	4	0	0	2
Trapezoid 	0	1	0	2	2	0
Rhombus 	0	2	0	2	2	2
Right Triangle 	1	0	0	2	0	1 **only if** it is an isosceles right triangle
Isosceles Triangle 	1 **if** it is an isosceles *right* triangle	0	0	3 But 2 if it is an isosceles right triangle	0 But 1 if it's an isosceles obtuse triangle	1