# FAMILY MATH

## Lines and Angles

Dear Family,

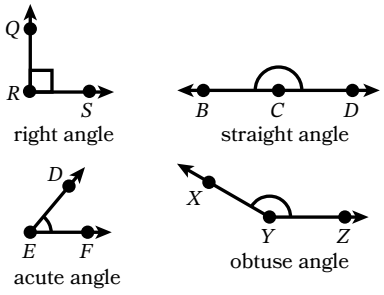
Your student is learning about geometric figures and angle types. They begin by drawing and labeling a point. They connect two points to make a line, a line segment, or a ray, and then connect two rays to make an angle. They learn to draw and compare different types of angles. Your student is also learning to identify and draw parallel and perpendicular figures. Students apply their learning in a real-world context as they create and describe floor plans. Understanding basic geometric figures will help your student classify shapes in future lessons.

**Key Terms**

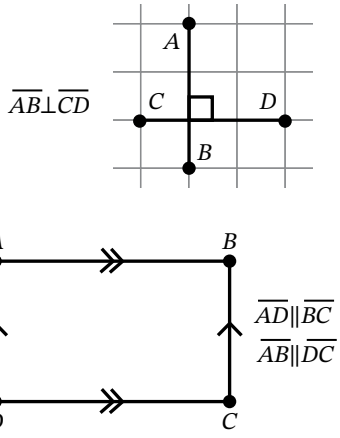
| | |
|---|---|
| acute angle | obtuse angle |
| angle | parallel |
| endpoint | perpendicular |
| figure | point |
| intersect | ray |
| line | straight angle |
| line segment | vertex |

| Term | Example | Notation |
|---|---|---|
| point | $A$ | $A$ |
| line segment | $A$, $B$ | $\overline{AB}$, $\overline{BA}$ |
| line | $C$, $D$ | $\overleftrightarrow{CD}$, $\overleftrightarrow{DC}$ |
| ray | $E$, $F$ | $\overrightarrow{EF}$ |
| angle | $G$, $H$, $I$ | $\angle G$, $\angle HGI$, $\angle IGH$ |

*Students draw and name geometric figures. They label their drawings with letters. Then they use the letters and symbols to identify the figures.*




*Students compare the size of an angle to a right or a straight angle to determine whether the angle is acute or obtuse.*




*Students learn that two line segments, lines, or rays are perpendicular if they intersect to form a right angle and are parallel if they never intersect.*

# At-Home Activities

## Angle Exercises

Play a game with your student to practice identifying types of angles. Gather eight index cards or pieces of paper. Label four cards as the following body parts: *arms*, *legs*, *hands*, and *whole body*. Put these cards in one pile. Label the other four cards as the angles: *acute*, *obtuse*, *straight*, and *right*. Put these cards in another pile. Take turns choosing a card from each pile and then using the body part on the card to make the angle. For example, if you pick *hands* and *obtuse* then you could use one or both hands to show an obtuse angle. If you pick *whole body* and *right* then you could sit up straight with your legs outstretched in front of you, arranging your whole body into a right angle. Play a few rounds with your student. If combinations repeat then try to show the angle in a different way each time.

## Which Is It?

Encourage your student to point out perpendicular and parallel relationships they see in their everyday life. For example, while on a walk notice that the sides of buildings are parallel and that streets are perpendicular at intersections. At home, your student may notice that the sides of a doorway are parallel to each other and perpendicular to the top of the doorway. At the start of the activity ask your student to predict how many parallel and perpendicular relationships they think they can find in one search. Keep a tally of how many of each relationship they find and compare it to their predictions.

# FAMILY MATH

## Angle Measurement

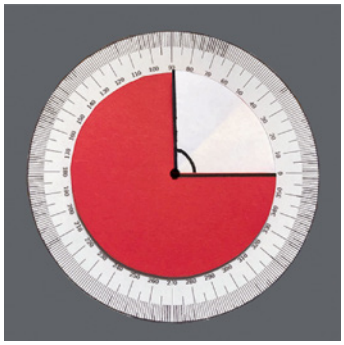
Dear Family,

Your student is learning to estimate, measure, and draw angles. They use what they know about fractions to describe angles as a fraction of a turn through a circle, which is 360 degrees. They use known angles, such as right angles and straight angles, to help them estimate an unknown angle measurement. Your student learns to use a 180 degree protractor to measure and draw acute, right, and obtuse angles.

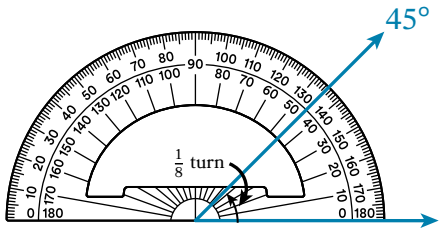
**Key Terms**

degree

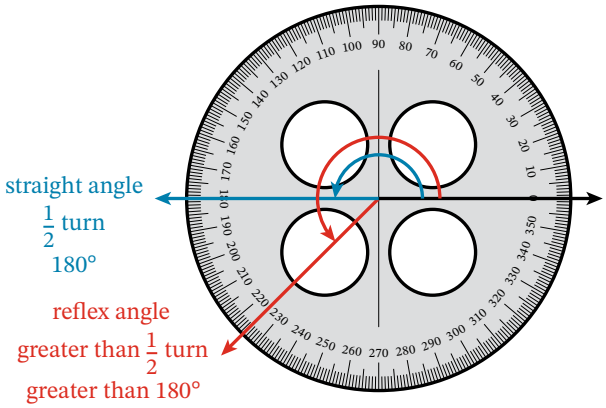
reflex angle



*Students write angle measurements as a fraction of a turn through a circle. An angle that is $\frac{1}{360}$ of 1 whole turn is a $1°$ angle. This angle has a measure of $90°$, which is the same as a $\frac{90}{360}$ or $\frac{1}{4}$ of a turn through a whole circle.*




*Students think about whether angles are acute or obtuse to help them read the correct measurement on a $180°$ protractor.*




*A reflex angle is larger than a straight angle. It has a measure greater than $180°$. Students use a $360°$ protractor to explore reflex angles.*

# At-Home Activities

## Turning Through a Circle

Encourage your student to think about how fractions of a whole turn are related to degrees. Use a spinner from a board game, a clock with hands that can be turned manually, or something similar you create with a paper plate and a pencil. Have your student choose any place to be $0°$ and keep track of that location. Then allow your student to rotate the pointer and experiment with different fractional turns. Considering asking the following questions.

- "How many degrees is $1$ whole turn? ($360$ degrees) A half turn? ($180$ degrees) A quarter turn?" ($90$ degrees)
- "If a $1$ quarter turn is $90$ degrees then how many degrees is a $3$ quarter turn?" ($270$ degrees)

## Estimate Angles

Have your student estimate angle measures they see in daily life, such as corners on walls, tree branches, or open doors. Your student might say, "I see an angle in the pattern on the rug. The angle looks a little smaller than a right angle but larger than $45°$. I think $80°$ is a good estimate for the measure of this angle."

If you have a protractor then encourage your student to check their estimate when possible.

# FAMILY MATH

## Determine Unknown Angle Measures

Dear Family,

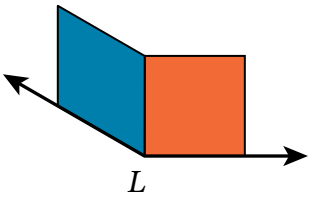
Your student has been learning to draw and measure angles. Now they are using addition and subtraction to find unknown measures of angles. They begin by combining pattern blocks and folding paper to break angles into measurable parts. They write and solve equations to find unknown angle measures. Students recognize that they can find the measures of angles without using a protractor by using what they know about different types of angles.

**Key Terms**

adjacent angles

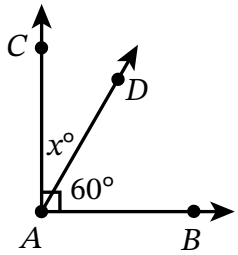
complementary angles

supplementary angles




$60 + 90 = 150$

*Students use pattern blocks to break apart an angle into two parts. They add the measures of the angles to find the measure of the larger angle.*

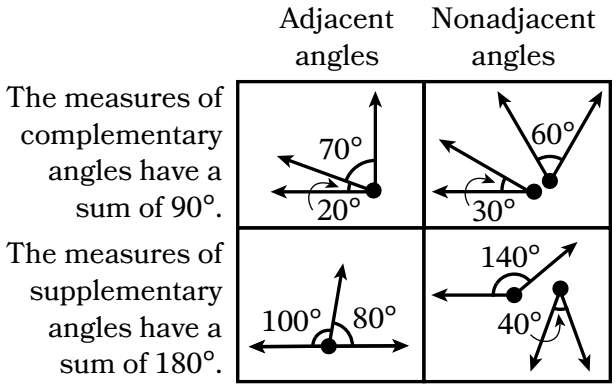



$x + 60 = 90$

$x = 30$

The measure of $\angle CAD$ is $30^\circ$.

*Students write and solve equations to find unknown angle measures in a drawing. This drawing shows that the larger angle is a right angle, so the measures of the smaller angles must add to $90^\circ$.*




*Students learn that two angles that share a vertex and a side are called adjacent angles. They also learn to identify complementary angles and supplementary angles.*

# At-Home Activities

## Explore Adjacent Angles

Help your student explore the relationship between two adjacent angles that form a right angle. Use the corner of a table to model a right angle. Tape a piece of yarn or string to the corner of the table to model a ray that can move. Use the yarn to create different pairs of complementary angles. Let your student move the ray and discuss the relationship between the angles they make. Consider asking the following questions.

- "Can you move the ray to make two angles that appear to have the same measure?"
- "If the two angles are equal in measure, what is the measure of each angle?"
- "Can you move the ray to make two angles that have very different measures?"
- "If the measure of one angle gets larger, what happens to the measure of the other angle?"

## Finding Complementary Angles and Supplementary Angles

Encourage your student to look for pairs of complementary angles and pairs of supplementary angles in their daily life. Following are examples to help guide their thinking.

- The corners of two books that are each right angles form a pair of supplementary angles because $90° + 90° = 180°$.
- Two pieces of pizza may represent complementary angles if the pizza is cut into eight equal slices.

# FAMILY MATH

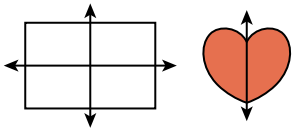
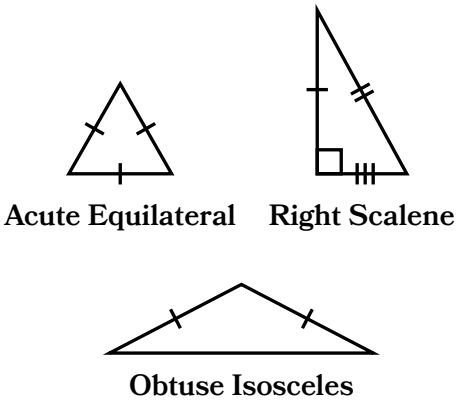
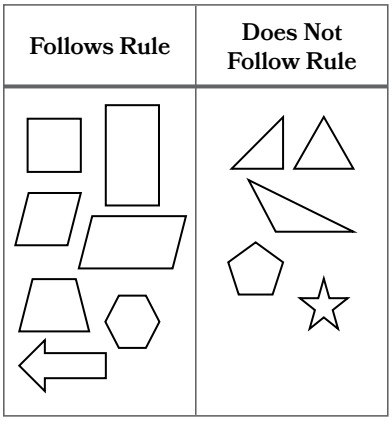
## Two-Dimensional Figures and Symmetry

Dear Family,

Your student is investigating lines of symmetry and classifying polygons. They fold paper and draw lines to identify symmetry in shapes and real-world images. They use what they know about angle measures to classify triangles as acute, obtuse, or right. They use side lengths to classify triangles as equilateral, isosceles, or scalene. Students continue to practice sorting and classifying shapes based on their attributes.

**Key Terms**

| | |
|---|---|
| acute triangle | obtuse triangle |
| equilateral triangle | right triangle |
| isosceles triangle | scalene triangle |
| line of symmetry | |

| | | |
|---|---|---|
| **Lines of Symmetry**<br>  |  <br>Acute Equilateral Right Scalene<br>Obtuse Isosceles |  <br>Follows Rule / Does Not Follow Rule |
| *Students learn that a line that separates a figure into two matching parts is called a line of symmetry.* | *Students can use the markings on a triangle to classify it. When the sides of a figure have the same markings, that shows the sides are equal in length. An equilateral triangle has all sides equal in length. An isosceles triangle has exactly two sides equal in length. A scalene triangle has no sides equal in length.* | *Students classify polygons based on a rule, or attribute. The shapes in this table are sorted based on whether they have a pair of parallel sides.* |

## At-Home Activities

### ABC Symmetry

Help your student use the letters of the alphabet to practice finding lines of symmetry. Have them write their name neatly with capital letters and ask them to mark any lines of symmetry they see on each letter. Discuss whether any letters have more than one line of symmetry or no line of symmetry. Repeat with the names of other family members or friends. See whether they can find names or words where all the letters have vertical lines of symmetry or all the letters have horizontal lines of symmetry. Challenge them to find all the letters in the alphabet that have no lines of symmetry.

## Build Triangles

Use toothpicks, dry spaghetti, sticks, or any similar object to construct triangles with your student. Discuss the attributes of each triangle you construct. Following are example questions to help you guide the discussion,

- "Look at the angles. Are the angles right angles? Are all the angles acute angles? Or is there an obtuse angle?"
- "Look at the sides. Are the sides all the same length? Are the sides all different lengths? Or are only two sides the same length?"

Use these attributes to classify the triangle as right, acute, or obtuse and as equilateral, scalene, or isosceles. Encourage your student to find as many combinations as they can. Keep in mind that some combinations, such as right equilateral, are not possible.