Points, Lines, Rays, and Angles

LESSON 30

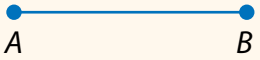
Dear Family,

This week your child is learning about points, lines, rays, and angles.

Here are some vocabulary words that tell about the geometry concepts that your child is learning.

A **point** is a single location in space. Point *A* is shown at the right.

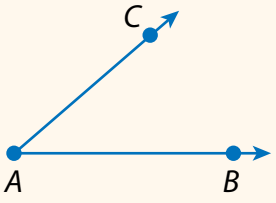
A **line segment** is a straight row of points that starts at one point and ends at another point. Line segment *AB* is written as $\overline{AB}$.



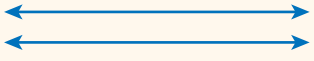
A **line** is a straight row of points that goes on forever in both directions. Line *AB* is written as $\overleftrightarrow{AB}$.

A **ray** is a straight row of points that starts at one point and goes on forever in one direction. Ray *AB* is written as $\overrightarrow{AB}$.

An **angle** is formed by two rays, lines, or line segments that meet at a common point called the **vertex**. The angle shown at the right can be named $\angle A$, $\angle CAB$, or $\angle BAC$.



Parallel lines are always the same distance apart and never cross.



Perpendicular lines cross to form a right angle.

Invite your child to share what he or she knows about points, lines, rays, and angles by doing the following activity together.

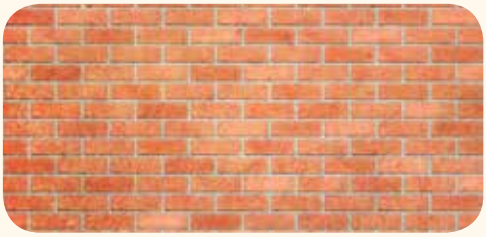
ACTIVITY POINTS, LINES, RAYS, AND ANGLES

Do this activity with your child to identify lines, rays, and angles.

Together with your child, find examples of real-life objects that have parts that look like lines, rays, and angles.

- Give clues to describe the objects to each other without naming the objects. Use some of the geometry vocabulary words that your child is learning about.
- Try to guess each object from the other person's description of it.
- Here are some real-life examples you might use:

Guitar strings (parallel line segments)



Brick wall (perpendicular and parallel line segments)

Ceiling fan (angles and line segments)

Fence (angles, parallel and perpendicular line segments)

Angles

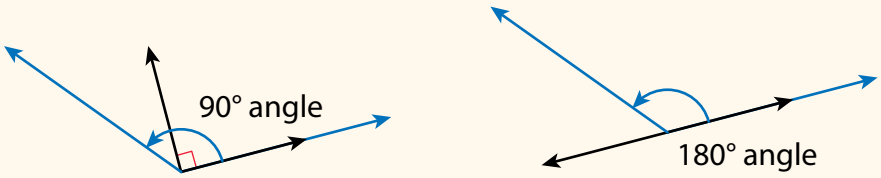
LESSON 31

Dear Family,

This week your child is learning to measure and draw angles.

Your child is learning how to find an angle's exact measure.

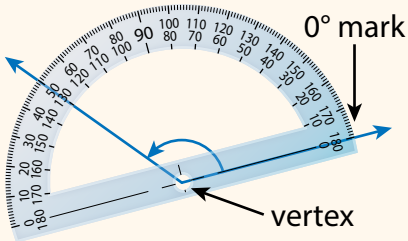
Before measuring an angle, it is helpful to estimate the measure by using benchmarks, such as a right angle and a straight angle. For example, to estimate the measure of the blue angle below, compare it to a right angle and to a straight angle.



A right angle has a measure of 90 **degrees**. A straight angle has a measure of 180 degrees. The measure of the blue angle is between 90 degrees and 180 degrees.

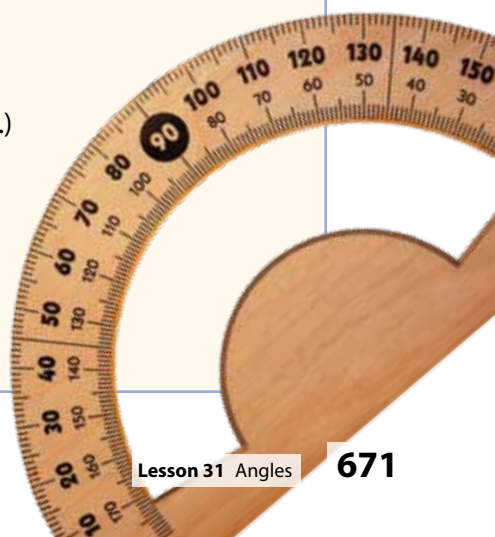
To find the exact measure of the angle, your child is learning to use a tool called a **protractor**.

- Line up the center point of the protractor with the vertex of the angle.
- Then line up one ray with the 0° mark.
- Read the mark on the protractor that the other ray passes through.



The angle measures 130°. (The ray also passes through the 50° mark, but since the angle is bigger than a 90° angle, the measure is not 50°.)

Invite your child to share what he or she knows about measuring and drawing angles by doing the following activity together.



ACTIVITY MEASURING ANGLES

Do this activity with your child to estimate the measure of angles.

- Identify angles in and around your home or outside in the yard or neighborhood. You can also look through magazines or newspapers for pictures that show angles.

  Here are some examples of angles you might find (or make):

Angles formed by the hands on a clock or watch

Angles made by a bicycle frame

Angles formed by fingers or by the bend of an elbow

- Estimate the measure of each angle by using right angles (such as the corner of a sheet of paper) and straight angles (such as the side of a sheet of paper) as benchmarks.

Look for other real-world opportunities to estimate angle measures with your child.

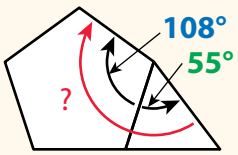
Add and Subtract with Angles

LESSON 32

Dear Family,

This week your child is learning to add and subtract with angles.

The two shapes at the right are placed together as shown. Two angle measures are given: 108° and 55°.



Since there are no gaps and no overlaps between the shapes, you can add the two angle measures together to find the measure of the larger angle formed by the two angles in the shapes.

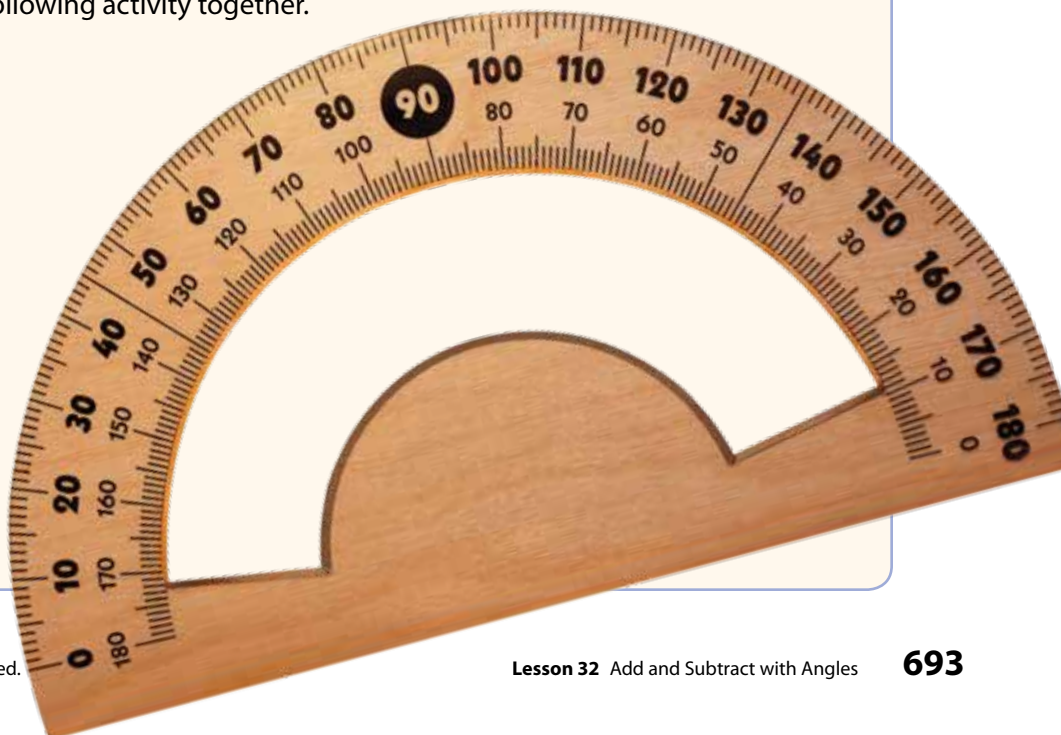
$108° + 55° = 163°$

The larger combined angle measures 163°.

Your child is also learning to use subtraction to find angle measures. In the example above, if the measure of the larger angle was given and the measure of one of the other angles was unmarked, your child could subtract to find the measure of the unmarked angle.

For example, $163° - 108° = 55°$.

Invite your child to share what he or she knows about adding and subtracting angles by doing the following activity together.

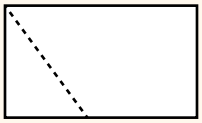


ACTIVITY ADDING WITH ANGLES

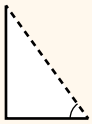
Do this activity with your child to add angles.

Materials sheet of paper, scissors

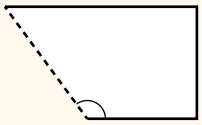
- Cut out a piece from a rectangular sheet of paper. Cut at an angle.



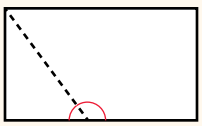
- Estimate the measure of the angle at the bottom of the piece you cut. For example, estimate that the angle measures about 50 degrees.



- Then estimate the measure of the angle at the bottom corner where you cut the sheet of paper. For example, estimate that the angle measures about 130 degrees.



- Now put the two pieces of paper back together. Add the estimates of the angle measures in order to find the measure of the angle formed by combining both angles. For example, $50° + 130° = 180°$.



- Ask your child to explain how you know the measure of the combined angle is 180 degrees. (Both angles combine to form a straight angle, which has a measure of 180°.)

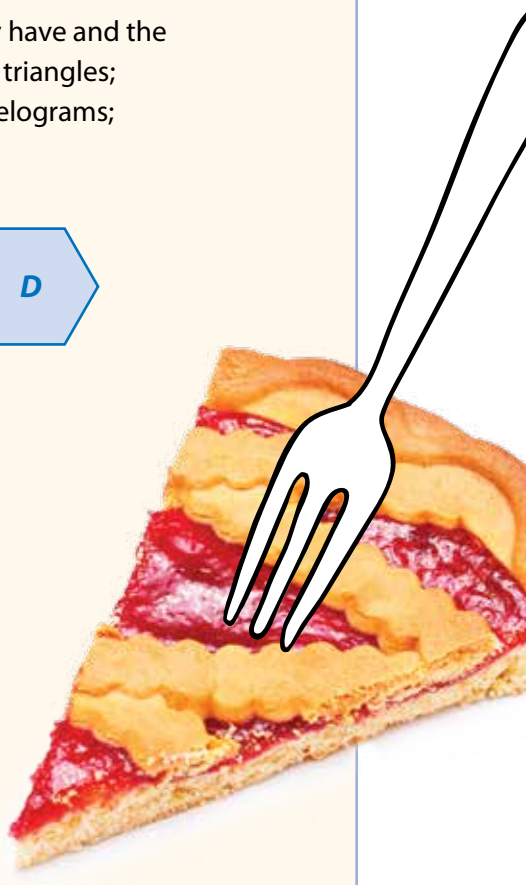
Classify Two-Dimensional Figures

LESSON 33

Dear Family,

This week your child is learning to classify two-dimensional shapes.

Shapes can be sorted into groups based on the kinds of sides they have and the kind of angles they have. Some shapes your child is classifying are triangles; quadrilaterals such as squares, rhombuses, **trapezoids**, and parallelograms; and **hexagons**.



One way to classify shapes is by the kinds of sides they have.

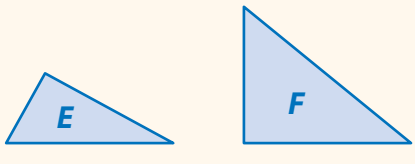
- Shapes *A* and *C* have parallel sides and perpendicular sides.
- Shapes *B* and *D* have parallel sides only.

Another way to classify shapes is by the kinds of angles they have.

- Shapes *A* and *C* have all right angles.
- Shape *B* has some acute angles and some obtuse angles.
- Shape *D* has all obtuse angles.

Triangles can be classified by their sides and angles.

- Triangle *E* is a **scalene triangle**. It has no sides the same length.
- Triangle *F* is a **right triangle**. It has a right angle.

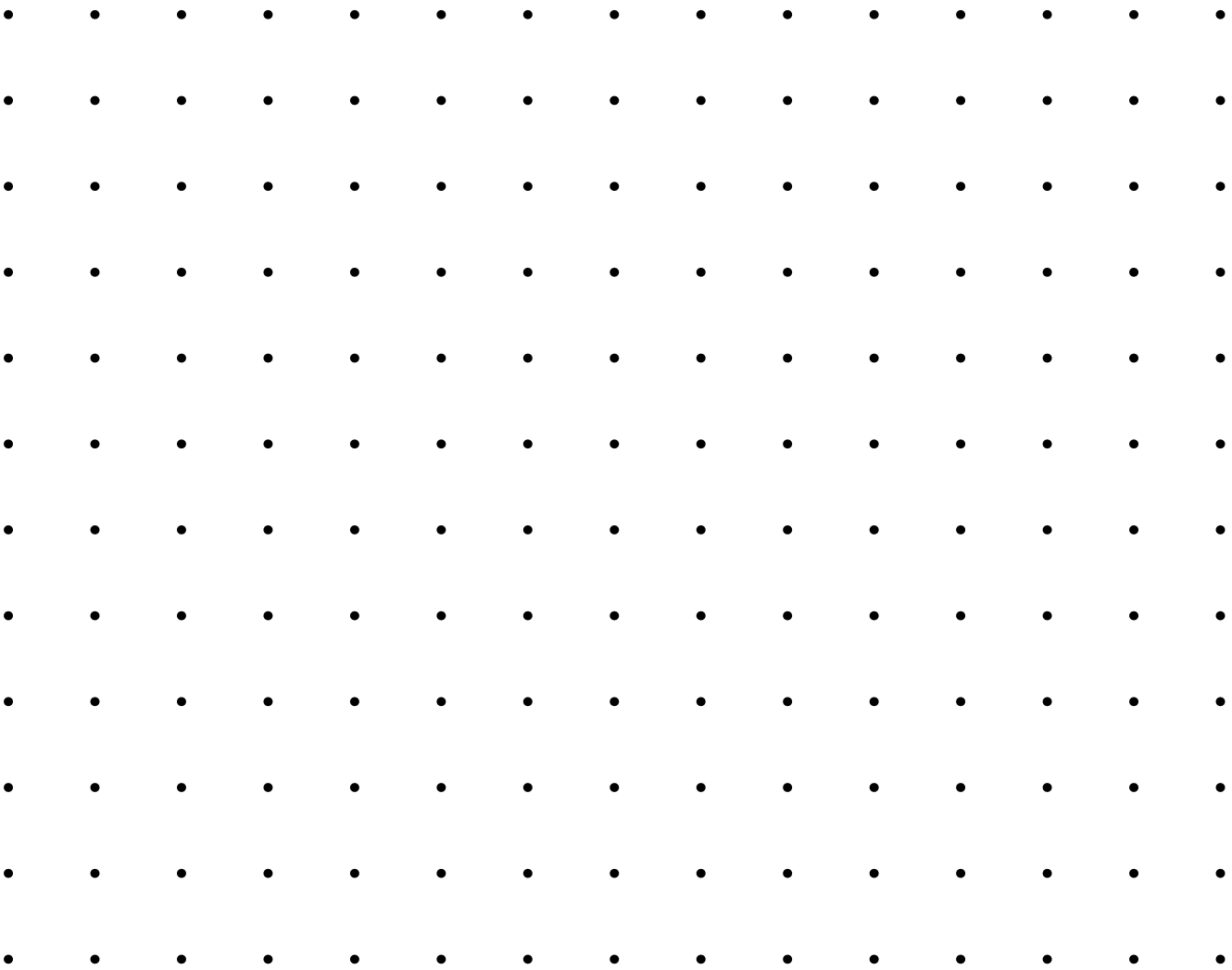


Invite your child to share what he or she knows about classifying two-dimensional figures by doing the following activity together.

ACTIVITY CLASSIFYING TWO-DIMENSIONAL FIGURES

Do this activity with your child to classify two-dimensional figures.

- Use the grid of dots below or make a dot grid on another sheet of paper.
- One person draws a shape. The shape could be a triangle, a quadrilateral, or another kind of shape with straight sides.
- The other person describes the shape. Be sure to talk about any parallel sides and perpendicular sides that the shape has. Describe the angles of the shape, too! Then name the shape.
- Switch roles. Take turns drawing a shape and describing and naming it.



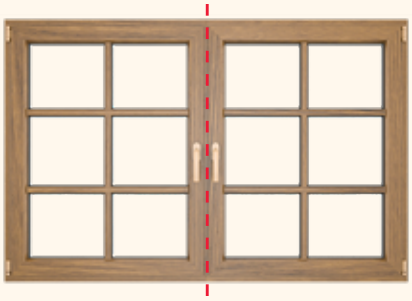
Symmetry

LESSON 34

Dear Family,

This week your child is learning about symmetry.

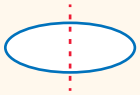
You can find symmetrical shapes in real life, in both natural and man-made objects.



A **line of symmetry** is a line that divides a shape into two mirror images.

Your child is learning to identify lines of symmetry in shapes.

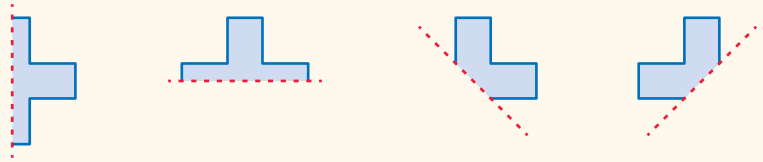
The horizontal line divides the oval into two matching parts. It is a line of symmetry.



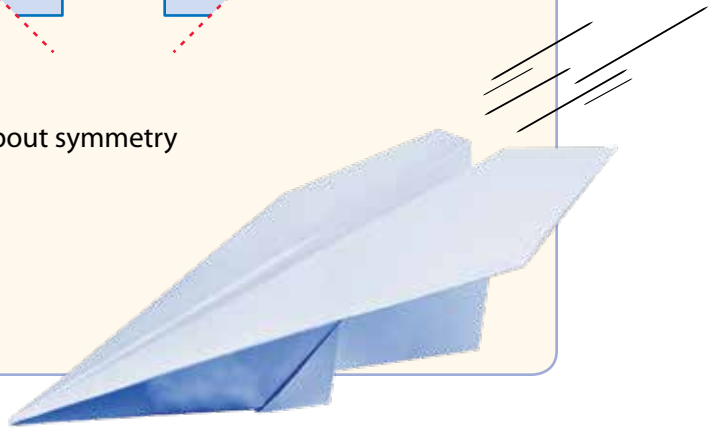
The vertical line divides the oval into two matching parts. It is also a line of symmetry.

Your child is also learning to draw lines of symmetry. One way to do that is to imagine folding a shape in different ways.

To draw lines of symmetry in this shape forming a plus sign, imagine each way it could be folded to form matching parts.



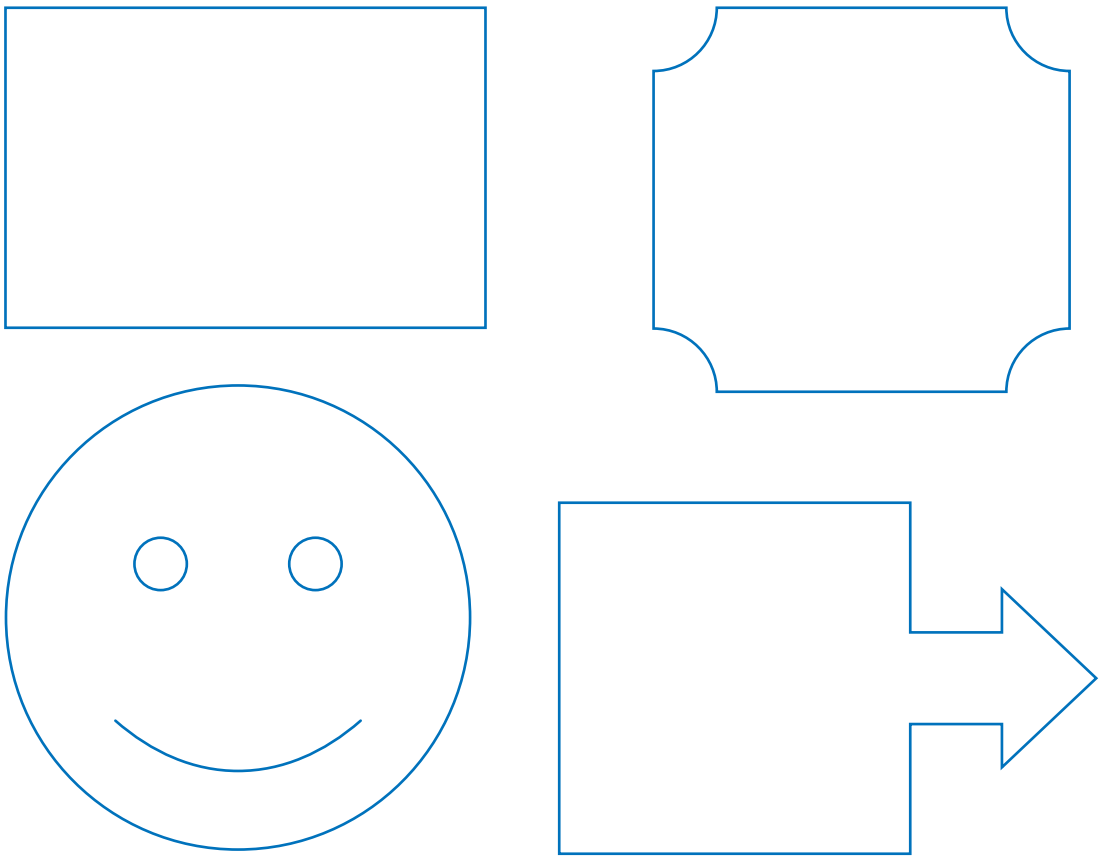
Invite your child to share what he or she knows about symmetry by doing the following activity together.



ACTIVITY SYMMETRY

Do this activity with your child to explore symmetry.

- Look together at the shapes below. Discuss which shapes you think have at least one line of symmetry.
- Describe to each other where the line(s) of symmetry could be drawn.
- Have your child draw the lines of symmetry on the shapes.
- Carefully cut out each shape and fold the shape along the line(s) of symmetry that your child drew.
- Talk about whether each line divides the shape into two matching parts.



Answers: rectangle: 1 horizontal and 1 vertical line of symmetry; square with curved corners: 1 horizontal and 1 vertical line of symmetry, 2 diagonal lines of symmetry; smiley face: 1 vertical line of symmetry; block with arrow: 1 horizontal line of symmetry