

# Grade 8 Mathematics

## Geometry: Lesson 1

Read aloud to the students the material that is printed in **boldface type** inside the boxes. Information in regular type inside the boxes and all information outside the boxes should **not** be read to students. Possible student responses are included in parentheses after the questions.

NOTE: The directions read to students may depend on the available materials. Read only those parts of the lesson that apply to the materials you are using.

Any directions that ask you to do something, such as to turn to a page or to hand out materials to students, will have an arrow symbol ( $\Rightarrow$ ) by them.

### *Purpose of Lesson 1:*

- In this lesson, the tutor and the students will
  - ✓ understand the concept of point, line, segment, and ray;
  - ✓ draw, identify or label a point, line, line segment, or ray;
  - ✓ draw, identify, or label horizontal, vertical, intersecting, parallel, and perpendicular lines; and
  - ✓ classify angles as right, obtuse, acute, or straight.

### *Equipment/Materials Needed:*

- One copy of Student Sheet 29 for each student
- Paper and pencils

### *Preparations before beginning Lesson 1:*

- Run off one copy of Student Sheet 29 for each student.
- Have paper and pencils available.

## Lesson 1: Geometry


Say:

**Geometry can be found many places in the real world. Looking at a map can help you understand some of the basic terms in geometry.**

⇒ Give Student Sheet 29 to the students.

Say:

**On the map of Water World, we can see a lot of geometry. A *point* is a place in space. Points have no length or width, so we really can't see them; but they are there. We usually show where a point is by drawing a dot ( · ), and often we label the point by using a capital letter. Can you find a labeled point on the map. Pause, let the students look. (The labeled point is S, or Shark Tower.)**

**Have you ever been on a road that you thought went on forever? A *line* is a string of points that goes on forever at each end. Since we can't draw something that goes on forever, we put arrowheads at each end of the line.  Can you find a street on the map that shows a **straight line**? (North, East, South, and West Streets) **Lines that go left to right or right to left are called *horizontal lines*. Think of the horizon. Name a street that is horizontal line. (West or East Streets) Lines that go up and down are called *vertical lines*. Name a street that is vertical line. (North or South Streets)****

**A string of points that go on forever in one direction is called a *ray*. A ray has one endpoint. Bayou Blvd. is a ray. Can you find another ray? (Water Way)**

**Ocean Avenue starts at East Street and ends at West Street. It is part of a line and is called a *line segment*. A line segment has two endpoints. We can measure the length of line segments if we want to. Can you find the other line segments? Pause, allow the students to find as many as they can. (Lake Ave., Deep Water Crossing, River Road, and Seashore Street)**

Say:

**Do any of the lines, segments, or rays cross each other? (Yes. There are many places: Ocean Ave. and Bayou Blvd., Ocean Ave. and River Road, River Road and Water Way, etc.) When lines or segments cross, we say they *intersect*.**

Say:

When lines, rays, or segments intersect, they intersect at a point and form angles. The point of intersection is called the *vertex* of the angle. Angles can be measured and are measured in *degree* units.

Angle names are based on their measures. When angles form square corners, they are called *right angles*, and have a measure of  $90^\circ$ . The intersection of Ocean Ave. and Bayou Blvd. forms right, or  $90^\circ$ , angles. Can you find other right angles? (Ocean Ave. and River Road, Ocean Ave. and Seashore St., Ocean Ave. and West St., Lake Ave. and East St., etc.) Find a  $90^\circ$  angle on the map that is labeled with a letter. (g)

If an angle measure is smaller than  $90^\circ$ , it is called an *acute angle*. The measure of  $\angle a$ , where Seashore St. and Water Way intersect is an acute angle. Can you find another acute angle? ( $\angle d$ ,  $\angle e$ )

An angle that measures greater than  $90^\circ$  and less than  $180^\circ$  is called an *obtuse angle*. The intersection of Water Way and Seashore St. forms  $\angle b$ . Its measure is greater than  $90^\circ$  and less than  $180^\circ$ . Can you find another obtuse angle? ( $\angle c$ ,  $\angle f$ )

A *straight angle* is one that measures  $180^\circ$ . It is basically a straight line.  $\angle a$  and  $\angle b$  added together form a straight angle. What other two labeled angles form a straight angle? ( $\angle e$  and  $\angle f$ )

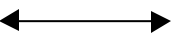
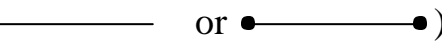
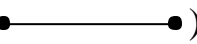
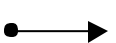
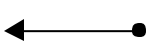
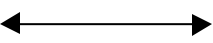
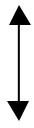
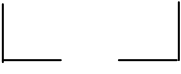





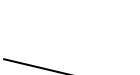

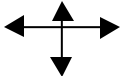
When two lines or segments intersect at right angles, we say the lines are *perpendicular*. We use this symbol for perpendicular ( $\perp$ ). Is Deep Water Crossing perpendicular to South Street? (No. They do not form a square corner.)

Say:


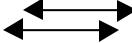
Sometimes lines or line segments never cross or intersect. On the map, West St. and East St. will never cross. If we could keep driving on Ocean St. and Lake Ave., they would never cross. Lines and line segments that never cross and always stay the same distance apart are called *parallel lines*. Can you find another set of parallel lines or segments? (South St. and North St., Seashore St. and River Road, etc.)

⇒ To check for understanding, have the students do the following tasks.

Say:

1. **Show a point. Label it P.** (Response: • P)
2. **Draw a line.** (Response: ) Make sure students put arrowheads at each end.
3. **Draw a line segment.** (Response:  or ) Make sure there are no arrowheads.
4. **Draw a ray.** (Response  or ) Make sure the rays have only one arrowhead.
5. **Draw a horizontal line.** (Response: ) Make sure the line goes left to right, or right to left, and that the line has arrowheads.
6. **Draw a vertical line.** (Response: ) Make sure the line goes from top to bottom and has arrowheads.
7. **Draw a right angle.** (Response: ,  or ) Just make sure that the angle has a square corner or a measure of  $90^\circ$ .
8. **Draw an acute angle.** (Response:  or ) The angle must be less than  $90^\circ$ .
9. **Draw an obtuse angle.** (Response:  or ) The angle must be greater than  $90^\circ$ .
10. **Draw a pair of intersecting lines.** (Response:  or )  
The lines may be perpendicular, but do not have to be. The lines have to cross at some point.

11. **Draw a pair of perpendicular lines.** (Response: ) The 2 lines must cross at right angles.

12. **Draw a pair of parallel lines.** (Response:  or ) The lines must not cross, and they must be the same distance apart at all points.



These lines are not parallel. They would cross if extended.

⇒ Have one student summarize today's lesson. The students should see that the terms of geometry are found in many areas of everyday life.

**Student Sheet 29 (Geometry: Lesson 1)**

**This is a map of Water World, USA.**

