

Grade 4 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 angle;
 - ✓ draw, identify, or label a point, line, line segment, or angle; and
 - ✓ draw, identify, or label horizontal, vertical, intersecting, parallel, and perpendicular lines.

Equipment/Materials Needed:

- One copy of Student Sheet 47 for each student
- Paper and pencils

Preparations before beginning Lesson 1:

- Run off 1 copy of Student Sheet 47 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.

⇒ Distribute Student Sheet 47 and say:

On the map of Clock Land, 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 (\cdot), and often we label it by using a capital letter. Can you find a labeled point on the map? Pause. Let the students look. (The labeled point is C or Clock 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. \longleftrightarrow Can you find a street on the map that shows a straight line? (North, East, South, and West) Lines that go left to right or right to left, are called *horizontal lines*. Think of the horizon. Name a horizontal line. (West or East Street) Lines that go up and down are called *vertical lines*. Name a vertical line. (North or South Street.)

Hickory Avenue starts at West Street and ends at East Street. It is part of a line and is called a *line segment*. A line segment has 2 endpoints. We can measure the length of line segments if we want to. Can you find the other line segments? Pause. Allow the students time to find as many as they can. (Dickory Ave., Mouse Path, Dock Dr., Run Road, One Rd., and Clock Blvd.)

Say:

Do any of the lines or segments cross each other? This activity may take the students a few minutes to understand. (There are many places, Hickory Ave. and Dock Dr., Hickory Ave. and Run Road, Run Road and Clock Blvd., etc.) When lines or segments cross, we say they *intersect*. Tell me two streets that intersect. (One Rd. and Hickory Ave., any of the streets that cross.) When lines and segments intersect, they form angles. On the map, a, b, and d are angles.

Say:

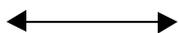
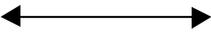
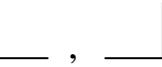
Sometimes lines intersect in special ways. If two lines or segments intersect and make a square corner, we say that they form *right angles*. Which of the three labeled angles is a right angle? (a) Can you find two other streets that intersect at right angles? (Run Rd. and Hickory Ave., One Rd. and Dickory Ave., West St. and North St., etc.) When two lines or segments intersect at right angles, we say the lines are *perpendicular lines*. We use this symbol for perpendicular: (\perp). Is Mouse Path perpendicular to Clock Blvd.? (No. They do not form a square corner.) Right angles have a measurement of 90° . Which angle - b or d - has a measurement of less than 90° ? (b)

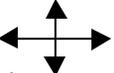
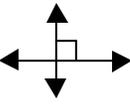
Say:

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 Hickory Ave. and Dickory 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., One Rd. and Run Road)

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

Say:

1. **Show a point. Label it P.** (\bullet P)
2. **Draw a line.** ( Make sure students put arrowheads at each end.)
3. **Draw a line segment.** ( or  Make sure there are no arrowheads.)
4. **Draw a horizontal line.** ( Make sure the line goes left to right, or right to left, and has arrowheads.)
5. **Draw a vertical line.** ( Make sure the line goes from top to bottom and has arrowheads.)
6. **Draw a right angle.** (Response:  ,  or  Just make sure that it has a square corner or an angle that measures 90° .)

7. **Draw a pair of intersecting lines.** ( or  The lines may be perpendicular, but do not have to be. They have to cross at some point.)
8. **Draw a pair or perpendicular lines.** ( The 2 lines must cross at right angles.)
9. **Draw a pair of parallel lines.** ( or  The lines must not cross and must be the same distance apart at all points.
- These are not parallel.  They would cross if extended.)

⇒ Have one student summarize today's lesson.

Student Sheet 47 (Geometry: Lesson 1)

This is a map of Clock Land USA.

