

**POWER BASICS**<sup>®</sup>

# Geometry

Robert Taggart

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# UNIT 1

## Lines and Angles



# LESSON 1: Points, Lines, and Dimensions

GOAL: To learn basic terms of geometry

## WORDS TO KNOW

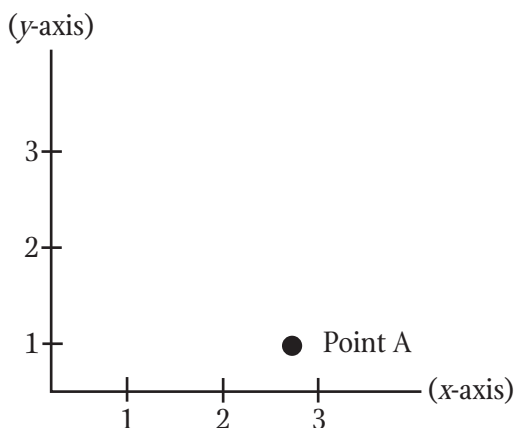
dimension	line segment	point
edges	parallel	ray
geometry	parallel lines	solid figure
line	plane	

## Basic Terms

**Geometry** is a kind of math that deals with points, lines, angles, planes, and shapes. The word “geometry” literally means “the measurement of the world.” Geometry is used to measure lines and shapes, and to show how they relate to one another. Geometry is used to build houses, bridges, and other structures, as well as in computer graphics, astronomy, and robotics. Everyday uses of geometry include figuring out how much carpet is needed to cover a floor, or how much water a fish tank will hold.

In this unit, you will learn about points, lines, angles, and planes.

Everything in geometry is a series of points. A **point** is a geometric element. A point has no length, width, or height. It can only be described by its position. A point is usually named by a capital letter, such as point A on the next page.



A **dimension** is a measure of length, width, or height. Points have no actual dimensions. In books, they are usually shown as a dot. The basic forms of geometry, such as lines and planes, are all built up of points.

A **line** is a set of points that are joined together. They have one dimension—length. They do not have width or height. Straight lines continue forever. In geometry books, a line is usually shown as a straight line with arrows on either end, like this:



Lines are infinite. They continue forever in both directions. Usually, people do not work with the whole line. They work instead with a part of a line. A part of a line with a beginning and an end is called a **line segment**. Like a line, a line segment has only length. It does not have width or height. Line segments are usually shown with a dot at either end of the line segment, like this:

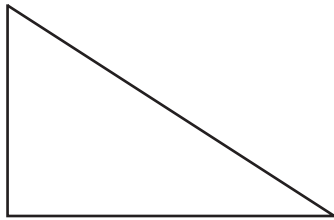


To show a line that continues forever on one end, but has an ending place on the other, you would use a **ray**. Rays, like lines

and line segments, have only one dimension: length. A ray is usually shown as a line with a dot at one end and an arrow at the other end, like this:

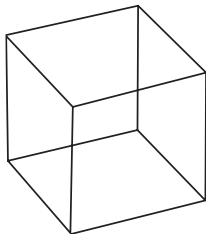


What if you joined three line segments to form a triangle shape? You would have a second dimension—width. As soon as you have width, you have a geometric element called a **plane**. A plane is a flat surface that has two dimensions, length and width. Unlike lines, plane figures are not infinite. They exist only in the area you can measure. This is what a plane figure looks like in a geometry book:



Plane figures can be in any flat shape you can think of—circles, squares, rectangles, triangles, and more. Any flat shape, whether it has curved lines or straight lines, is a plane figure.

A **solid figure** adds the third dimension of depth. Solid figures have length, width, and depth. Like a plane figure, a solid figure exists only in the area you can measure. You can measure its length, width, and depth. Because you are reading flat paper, you cannot really see a solid figure on a page. However, we can draw a figure to make it look more solid. Here is a drawing of a geometrical solid:



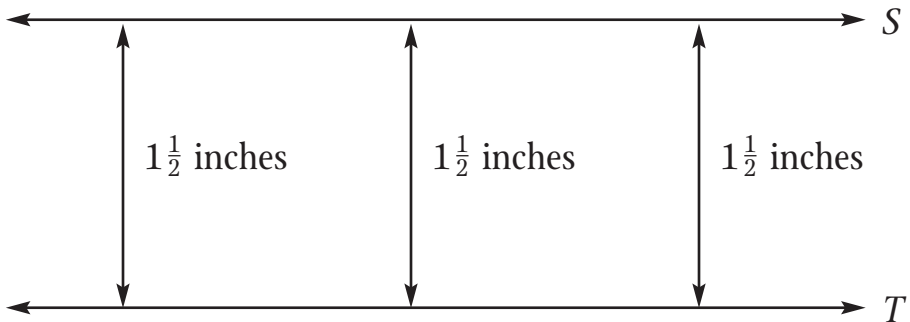
## ■ PRACTICE 1: What Is Geometry?

Circle the correct word or phrase to complete each sentence below.

1. A point can only be defined by its  
a. position.                      b. size.                      c. shape.
2. A line continues  
a. until it is stopped by a solid.  
b. forever in both directions.  
c. in all three dimensions.
3. A plane figure does not have  
a. depth.                      b. length.                      c. width.
4. A solid figure has \_\_\_\_\_ dimensions.  
a. 2                      b. 3                      c. 5

### Parallel Lines

Lines are one-dimensional. They have only one measurement—the measurement of length. In this unit, you will learn about a special property that some lines have. Look at the diagram below.



Look at the pair of lines above. The top line (line  $S$ ) is  $1\frac{1}{2}$  inches from the bottom line (line  $T$ ). If you made lines  $S$  and  $T$  in this diagram longer, the lines would still be  $1\frac{1}{2}$  inches apart.

The two lines would never cross, no matter how long you made them. Lines that never cross and stay the same distance apart are called **parallel lines**. Lines *S* and *T* on the preceding page are parallel lines.

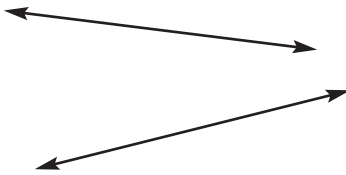
**THINK ABOUT IT**



Look at the following line: \_\_\_\_\_  
Is this line **parallel**? Why or why not? Can you tell from the information given? Write your answer on a separate sheet of paper.

**PRACTICE 2: Parallel Lines**

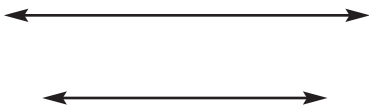
Look at each pair of lines below. Decide if the lines are parallel. If the lines are parallel, write *parallel* on the line below the diagram. If the lines are not parallel, write *not parallel* on the line below the diagram.



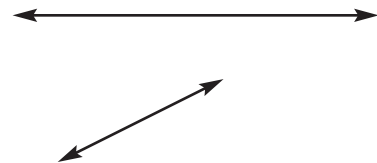
1. \_\_\_\_\_



2. \_\_\_\_\_



3. \_\_\_\_\_



4. \_\_\_\_\_