

Geometry

- literally means “earth measure”
- study of shapes and their relationships
- oldest branch of mathematics

3 main “building blocks”

- point
 - a location, usually represented by a dot
 - points are infinitely small
 - no length, width, or thickness
 - 0 dimensions
 - We typically represent points with dots and name them with capital letters.



- line
 - shortest path from one point to another
 - infinitely thin; no thickness
 - extends forever in opposite directions
 - 1 dimension
 - Usually named by two points that form it.

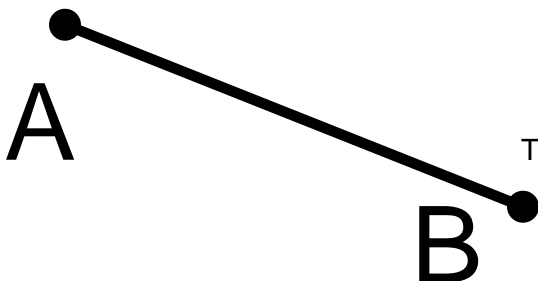


This line is called \overline{PQ} or \overline{QP} .

- plane
 - flat surface with no thickness and no boundaries
 - extends forever, but infinitely thin
 - 2 dimensions

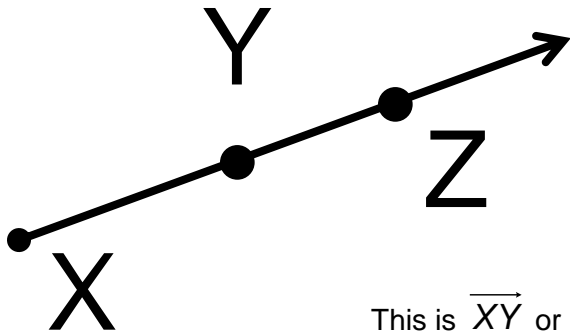
Parts of lines

- Segment
 - Connects two points
 - Stops at the endpoints
 - Named by putting a bar above the endpoints



This is \overline{AB} or \overline{BA} .

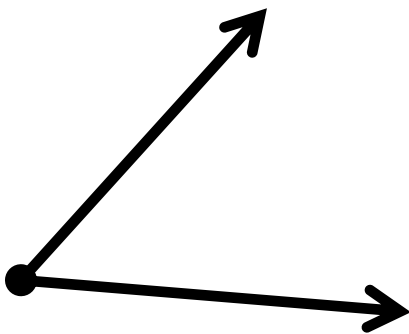
- Ray
 - Extends endlessly in one direction
 - Starts at an endpoint and continues.
 - Named with an endpoint and one other point on the ray, with an arrow above them.



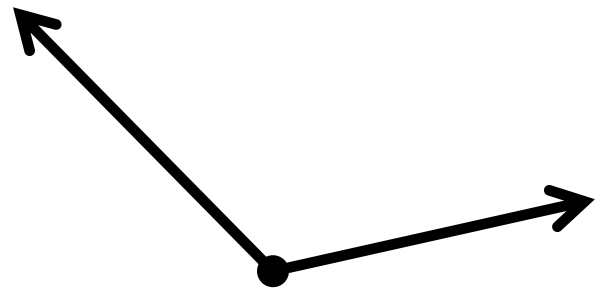
(The first letter must be the endpoint.)

Angle

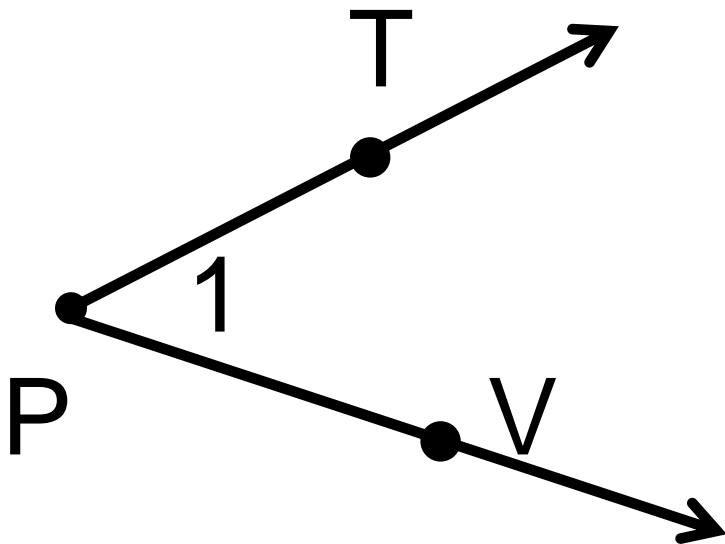
- Two rays with the same endpoint




or



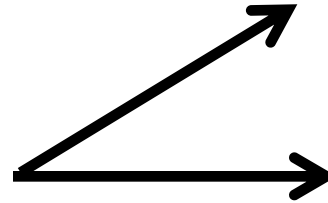
- The rays are the sides of the angle.
- The common endpoint of the 2 rays is the vertex of the angle.
- You can name angles many different ways:



- This can be called $\angle 1$, $\angle P$, $\angle TPV$, or $\angle VPT$
 - named with 1 letter, the letter must be the vertex
 - named with 3 letters, the middle letter is the vertex, and the others are 1 point on each ray
- Note your book uses the symbol  instead of \angle .

Measuring Angles

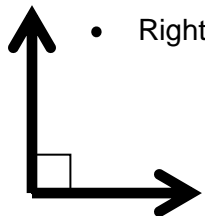
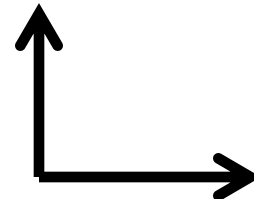
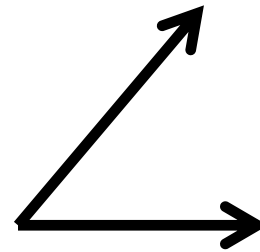
- You measure how wide an angle opens; what part of a circle it makes.
 - Both of these angles have the same measure:



- The oldest and most common way to measure angles is with degrees.
 - A full circle has 360°
 - A straight line has 180°

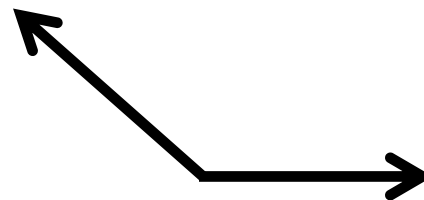
Types of angles

- Acute
 - less than 90°



- Right
 - exactly 90°
 - We often use a box to show an angle is a right angle.

- Obtuse
 - between 90° and 180°



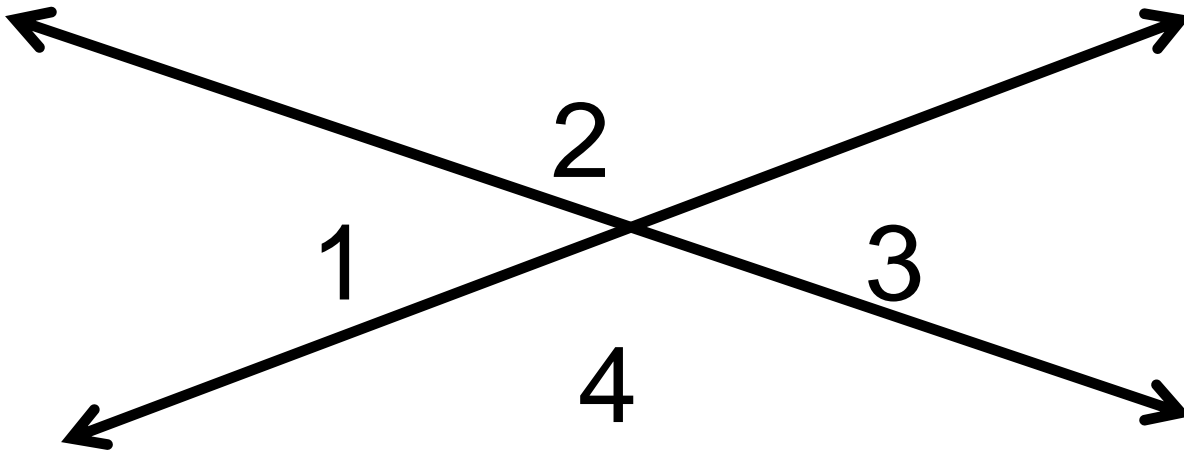
- Straight
 - exactly 180°
 - Same as a line



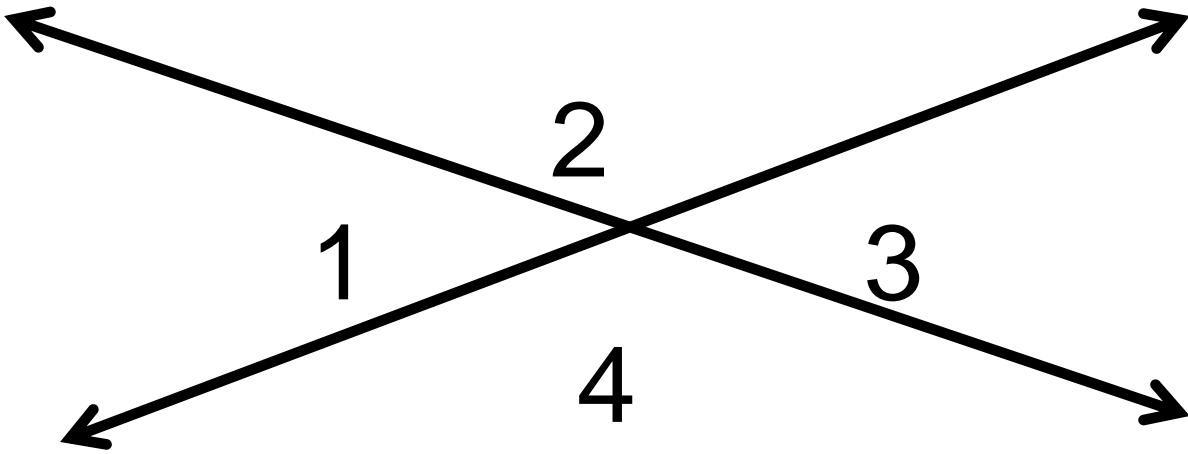
The tool used to measure angles is called a protractor.

Special pairs of angles

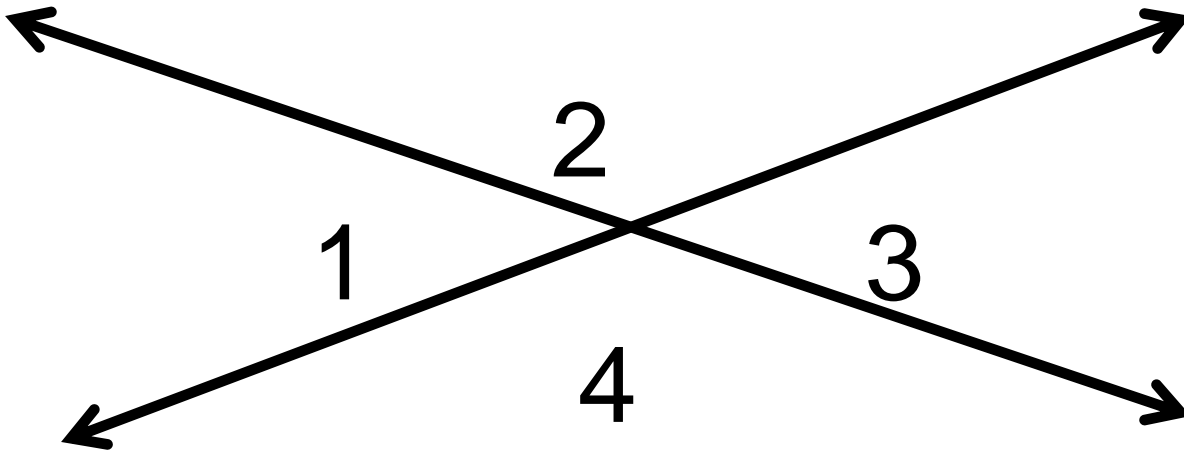
- Complementary angles
 - Add up to 90°
 - 34° and 56° are complementary.
 - The **complement** of 70° is 20° .
- Supplementary angles
 - Add up to 180°
 - 115° and 65° are supplementary.
 - The **supplement** of 40° is 140° .
- Vertical angles
 - When lines cross, the angles that are across from each other are vertical angles.



- In the picture $\angle 1$ and $\angle 3$ are vertical angles.
- $\angle 2$ and $\angle 4$ are another pair of vertical angles.
- The name comes from the fact that they only touch at the **vertex**.
- Vertical angles always have the same measure.



- If you are given $\angle 1$ measures 35° , you automatically know $\angle 3$ also measures 35° .



- What's more, because a line always has 180° , it's easy to figure out that if $\angle 1$ measures 35° , both $\angle 2$ and $\angle 4$ must measure 145° .

Parallel lines

- lie in the same plane and never intersect
- are always the same distance apart
- have the same slope

In pictures that involve parallel lines, angles that look equal always are equal.

