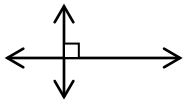
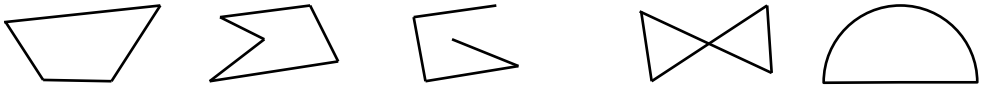
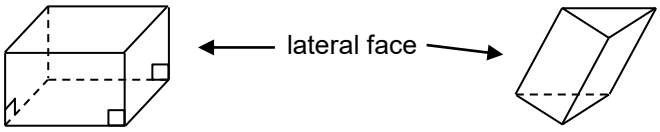
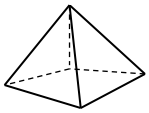
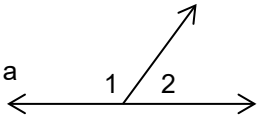
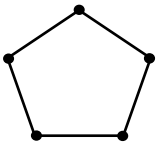
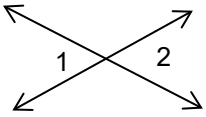
STUDENT RESOURCES

Word or Phrase	Definition
adjacent angles	Two angles are adjacent if they have the same vertex and share a common ray, and they lie on opposite sides of the common ray. $\angle ABC$ and $\angle CBD$ are adjacent angles.
complementary angles	Two angles are complementary if the sum of their measures is 90°. Two angles that measure 30° and 60° are complementary.
cross section	The intersection of a solid figure with a plane is a cross section of the figure.
parallel	Two lines in a plane are parallel if they do not meet. Two line segments in a plane are parallel if the lines they lie on are parallel.
perpendicular	Two lines are perpendicular if they intersect at right angles. 
plane	A plane refers to a flat two-dimensional surface that has no holes and that extends to infinity in all directions.
polygon	A polygon is a special kind of figure in a plane made up of a chain of line segments laid end-to-end to enclose a region. Each endpoint of a segment of the polygon meets one other segment, otherwise the segments do not meet each other. The line segments are the sides (or edges) of the polygon, and the endpoints of the line segments are the vertices of the polygon. A polygon divides the plane into two regions, an "inside" and an "outside." The region inside a polygon may also be referred to as a polygon.  polygons not polygons

Word or Phrase	Definition
prism	A prism is a solid figure in which two faces (the bases) are identical parallel polygons, and the other faces (referred to as the lateral faces) are parallelograms. If the lateral faces are perpendicular to the bases, the prism is a right prism. Otherwise, the prism is an oblique prism.  A right rectangular prism is a right prism whose bases are rectangles and faces are rectangles. An oblique triangular prism is a prism whose bases are triangles and faces are parallelograms.
pyramid	A pyramid is a solid figure in which one face (the base) is a polygon, and the other faces are triangles with a common vertex (the apex). Each edge of the base is the side of a triangular face with the opposite vertex at the apex. A triangular pyramid is a pyramid with a triangular base.  A square pyramid is a pyramid with a square base. The Egyptian pyramids are examples of square pyramids. 
solid figure	A solid figure refers to a figure in three-dimensional space such as a prism or a cylinder.
supplementary angles	Two angles are supplementary if the sum of their measures is 180°. Angles 1 and 2 are supplementary because they determine a straight line, or 180°. 
vertex	A vertex (pl. vertices) of a polygon or solid figure is a point where two edges meet. A pentagon has five vertices. 
vertical angles	Two angles are vertical angles if they are opposite angles formed by a pair of intersecting lines. $\angle 1$ and $\angle 2$ are vertical angles. 

Symbols and Conventions for Geometry Notation

Below are some geometry notations we will use. Note that we use absolute values to denote lengths of segments and measures of angles. This is consistent with more advanced levels of mathematics.

Points are named by capital letters.

The line segment from P to Q is denoted by $\overline{PQ}$.

The length of the line segment from P to Q is denoted by $|PQ|$, which is shorthand for $|\overline{PQ}|$.

The symbol for triangle is $\triangle$.

- The triangle in Figure 1 below may be denoted by $\triangle LMN$, or also by $\triangle LNM$. Vertices may be listed in either a clockwise or counterclockwise direction starting from any of the three vertices.

The symbol for angle is $\angle$.

- The angle at the top of Figure 1 below can be denoted by $\angle NLM$, or by $\angle a$ or by $\angle L$.
- The pair of adjacent angles in Figure 2 below are $\angle FGJ$ and $\angle HGF$. They share the common ray $\overrightarrow{GF}$. The two adjacent angles together form the angle $\angle JGH$.

Error alert: Using "$\angle G$" to name the angle below is ambiguous. We do not know if it refers to $\angle JGF$, $\angle FGH$, or $\angle JGH$.

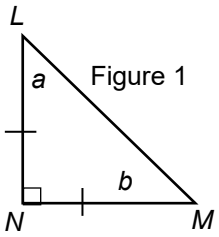
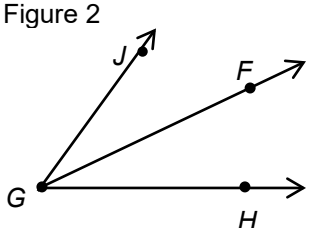


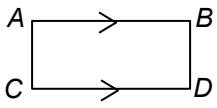
Figure 1

Figure 2


The measure of an angle $\angle N$ is denoted by $|\angle N|$. The small square at N indicates that $\angle LNM$ is a right angle, that is, that $|\angle LNM| = 90°$.

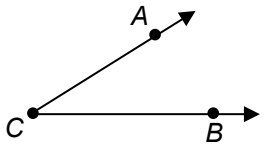
The single hash marks on the segments $\overline{LN}$ and $\overline{NM}$ indicate that the segments have equal length, that is, $|LN| = |NM|$.

The arrow marks on the segments $\overline{AB}$ and $\overline{CD}$ indicate that the segments are parallel.



Classifying Angles by their Degree Measure

An angle is a geometric shape formed by two (distinct) rays that share a common endpoint (the vertex of the angle).



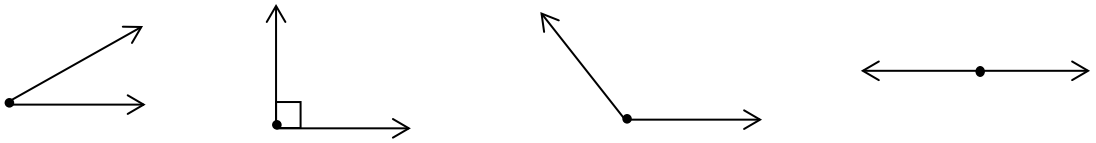
The angle in the figure to the right can be named any one of the following:

$\angle ACB$ *or* $\angle BCA$ *or* $\angle C$

The point C is the vertex of the angle. The rays $\overrightarrow{CA}$ and $\overrightarrow{CB}$ meet at C and form the sides of the angle.

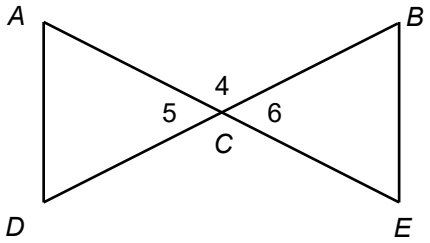
To each angle is assigned a degree measure between 0 and 180 degrees, which indicates the size of the angle. Angles may be classified by their degree measure.

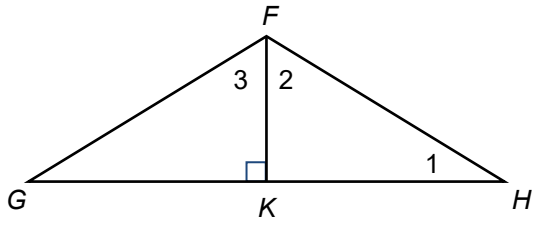
- An acute angle is an angle whose measure is less than 90°.
- A right angle is an angle whose measure is exactly 90°.
- An obtuse angle is an angle whose measure is between 90° and 180°.
- A straight angle is an angle whose measure is 180°. The sides of a straight angle are opposite rays that form a straight line.



acute angle | right angle | obtuse angle | straight angle

Special Angle Pairs



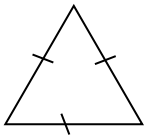
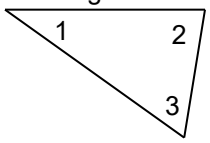


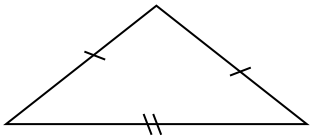
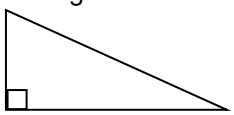
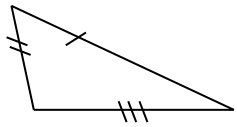
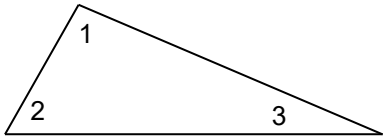
Angle Pairs	Defining Properties	Examples
complementary angles	sum of degree measures is 90°	$\angle KHF$ and $\angle KFH$ ($\angle 1$ and $\angle 2$)
supplementary angles	sum of degree measures is 180°	$\angle ACB$ and $\angle BCE$ ($\angle 4$ and $\angle 6$)
adjacent angles	two angles that share a common vertex and ray, and lie on opposite sides of the ray	$\angle GFK$ and $\angle KFH$ ($\angle 3$ and $\angle 2$)
vertical angles	opposite angles formed when two lines intersect	$\angle ACD$ and $\angle BCE$ ($\angle 5$ and $\angle 6$)

Some facts about angles:

Any two right angles are supplementary. This is because a right angle measures 90°, so any two right angles have measures with a sum of 180°.

In a right triangle, the two lesser angles are always complementary. This is because the sum of the measures of the angles of a triangle is 180°. Since the right angle measures 90°, the sum of the other two angles must be 90°.

<table>
<tr><th colspan="2">Classifying Triangles</th></tr>
<tr><td colspan="2">A triangle is a three-sided polygon. Triangles may be classified by their sides or by their angles.</td></tr>
<tr><th>Classification by Sides</th><th>Classification by Angles</th></tr>
<tr><td>An <u>equilateral</u> triangle is a triangle with three congruent sides.
  </td><td>An <u>acute</u> triangle is a triangle with three acute angles.
 

$|\angle 1| < 90°$ $|\angle 2| < 90°$ $|\angle 3| < 90°$</td></tr>
<tr><td>An <u>isosceles</u> triangle is a triangle with at least two congruent sides.
  </td><td>A <u>right</u> triangle is a triangle with one right angle.
 
The square in the corner indicates that the angle measures 90°.</td></tr>
<tr><td>A <u>scalene</u> triangle is a triangle with no congruent sides.
  </td><td>An <u>obtuse</u> triangle is a triangle with one obtuse angle.
 

$|\angle 1| > 90°$ $|\angle 2| < 90°$ $|\angle 3| < 90°$</td></tr>
<tr><td colspan="2">Note that an equilateral triangle is also <u>equiangular</u> because all three angles measure 60°.</td></tr>
</table>

Some Properties of Quadrilaterals

A quadrilateral is a four-sided polygon. Some of the common types of quadrilaterals are:

rectangle	A quadrilateral with four right angles. Opposite sides of a rectangle are parallel and have the same length.
square	A quadrilateral with four congruent sides and four right angles. A square is a rectangle.
parallelogram	A quadrilateral in which opposite sides are parallel. Opposite sides of a parallelogram have the same length, and opposite angles have the same measure.
rhombus	A quadrilateral whose four sides have the same length. A square is a rhombus, but a rhombus is not necessarily a square. (The plural of "rhombus" is either "rhombuses" or "rhombi.")
trapezoid	A quadrilateral with at least one pair of parallel sides.
kite	A quadrilateral whose four sides can be grouped in two pairs of adjacent sides of the same length. The two vertices where the congruent sides meet determine a line of symmetry of the kite.