

UNIT 7 GOALS:

- Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
- Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint and understand the concept of angle measurement.
- Measure angles in whole-number degrees using a protractor. Understand that angles are measured with reference to a circle.
- Recognize angle measure as additive. Understand that when an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts.
- Classify two dimensional figures based on the presence or absence of parallel or perpendicular lines, or by their angles.
- Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify symmetric figures and draw lines of symmetry.

VOCABULARY

Point – precise location in the plane.

Line – straight path with no thickness that extends in both directions without end.

Line Segment – part of a line connecting two endpoints.

Ray – a part of a line which starts at a point and goes off in a particular direction to infinity (always name a ray by starting with its endpoint).

Angle – union of two different rays sharing a vertex.

Vertex – a point, often used to refer to the point where two lines meet, such as in an angle or the corner of a triangle.

Obtuse angle – angle with a measure greater than 90 degrees but less than 180 degrees.

Acute angle – angle with a measure less than 90 degrees.

Right angle – angle with a measure of 90 degrees.

Vocabulary Continued

Straight angle – angle with a measure of 180 degrees.

Parallel – two lines in a plane that do not intersect.

Perpendicular – two lines are perpendicular if they intersect, and any of the angles formed between the lines is a 90 degree angle.

Intersecting lines – lines that contain at least one point in common.

Triangle – consists of three points and three line segments between them.

Obtuse triangle – triangle with an interior obtuse angle.

Right triangle – triangle that contains one 90° angle.

Acute triangle – triangle with all interior acute angles.

Scalene triangle – triangle with no sides or angles equal.

Isosceles triangle – triangle with at least two equal sides.

Equilateral triangle – triangle with all equal sides or angles.

Quadrilateral – polygon with four sides.

Rectangle – quadrilateral with two pairs of congruent, parallel sides and four right angles.

Square – a parallelogram with four congruent sides and four right angles.

Rhombus – a parallelogram with all four sides equal in length.

Parallelogram – a quadrilateral with two pairs of parallel and congruent sides.

Trapezoid – quadrilateral with at least one pair of parallel sides.

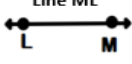

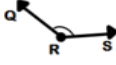
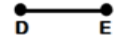

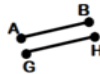
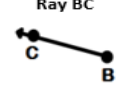

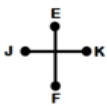
Line of symmetry – a line that divides a figure into two congruent halves that are mirror images of each other.

Resources for Unit 7



Lines and angles

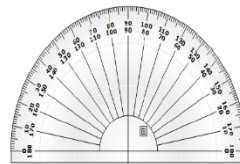
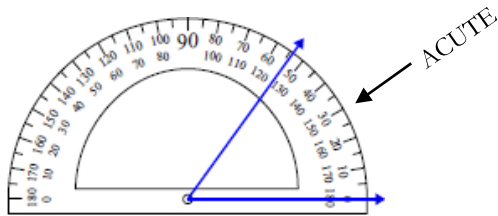
Students will draw points, lines, line segments, rays, angles, and perpendicular and parallel lines. Identify these in two-dimensional figures.

Name and Picture	Symbol	Name and Picture	Measurement	Name and Picture	Symbol
Line LM or Line ML 	\overleftrightarrow{LM} or \overleftrightarrow{ML}	Right Angle 	90° Angle	Angle QRS Or Angle SRQ 	$\angle QRS$ or $\angle SRQ$
Line Segment DE Or Line Segment ED 	\overline{DE} or \overline{ED}	Acute Angle 	Angle less than 90°	Parallel 	$\overline{AB} \parallel \overline{GH}$ Line segment AB is parallel to line segment GH
Ray BC 	\overrightarrow{BC}	Obtuse Angle 	Angle greater than 90° but less than 180°	Perpendicular 	$\overline{EF} \perp \overline{JK}$ Line segment EF is perpendicular to line segment JK

Types of Protractors

Standard or Half

Circular Protractor



Consider the example above.

A student uses a protractor to measure the angle above. **First, the student identifies whether the angle is acute or obtuse.** This helps the student understand which numbers to use on the protractor. Then, the student lines up the center of the protractor with the vertex to measure the angle. Finally, the student starts at 0° and counts up to find the angle measures 54°.

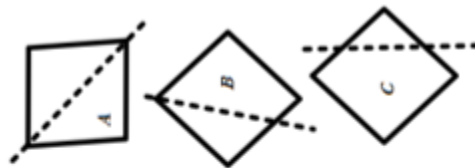
Games to Play for Practice with this Concept:

Math Playground – Alien Angles
Primary Games – Banana Hunt



Symmetry

Line of symmetry – a line that divides a figure into two congruent halves that are mirror images of each other.



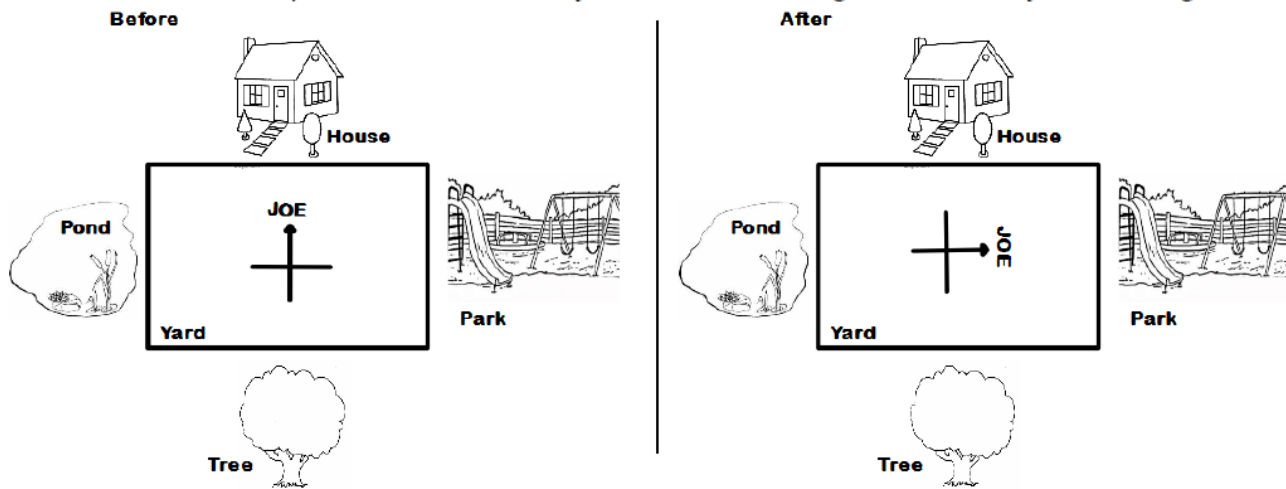
Consider figures A, B, and C. Only one of them shows a line of symmetry. Students will need to see that figure A can be folded along the dotted line making the halves be mirror images of each other. Therefore, figure A has the line of symmetry.

Angles as Turns

Students further explore angle measure as an amount of turning. They reason that a $\frac{1}{4}$ turn is a right angle and measures 90° , a $\frac{1}{2}$ turn measures 180° , a $\frac{3}{4}$ turn measures 270° , and a full turn (or one whole) measures 360° . They go on to apply these angles to their environment.

Example Question and Answer

Joe stood in the middle of the yard and faced the house. Joe turned 90° to the right. To what was Joe now facing?



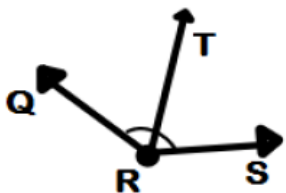
Answer: Joe would be facing the park.



Problem Solving with the Addition of Angle Measures

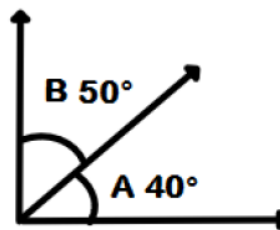
Students will decompose angles and use the addition of adjacent angle measures to solve problems using a symbol for the unknown angle measure.

Adjacent Angle-two angles are adjacent if they have a common side and a common vertex and don't overlap. Consider the example below.



$\angle QRT$ is adjacent to $\angle TRS$
because they share ray RT or \overrightarrow{RT}

Complementary Angle-two angles with the sum of 90° .



In this example, angle A measures 40° and angle B measures 50° . Together they form a 90° angle. They are complementary.



Supplementary Angle-two angles with the sum of 180° .

In this example, angle $\angle TRS$ measures 45° and angle $\angle QRS$ measures 180° . Together they form a 180° straight angle. They are supplementary. To find the measure of $\angle QRT$ you have to subtract $180^\circ - 45^\circ$, which equals 135° for $\angle QRT$.

