

# Draw and Measure

## Purpose

Students will measure, identify, and draw angles, perpendicular and parallel lines, rectangles, triangles, and circles.

## Materials

*For the teacher:* compass, ruler, protractor, overhead projector, overhead markers

*For each student:* copy of Black Line Master (BLM) *Draw and Measure*, compass, ruler, protractor, pencil

## Activity

### A. Introduction

1. Explain to students that they are going to draw geometric figures with the help of a compass, ruler, and protractor.
2. Say: "The figures that we will draw are angles of different sizes. Do you know the name of an angle that has a measure less than  $90^\circ$ ? Do you know the name of an angle that is equal to  $90^\circ$ ? Do you know what kind of angles are greater than  $90^\circ$ ?"
3. Explain to students that they are going to draw and measure acute, right, and obtuse angles and they will draw perpendicular and parallel lines.
4. Write on the overhead "acute angles," "right angles," "obtuse angles," "perpendicular and parallel lines."

### B. Teacher-Led Activity

1. Draw a circle on the overhead with a compass, starting with a previously marked point as its center. Mention to students that you place the compass point on the center of the circle and that all the points on the circle are the same distance from this center point.
2. Have students mark a center point on their paper and draw a circle using this point as center.
3. Draw several angles on the overhead using the protractor and have students draw the same angles on their papers.

(continued)



### INCORPORATING TECHNOLOGY

Have students use a computer program to draw angles and shapes.



### EXTENDING THE ACTIVITY

Have students construct a square picture frame with four lengths of wood and four nails. Assist students in finding that their frame is not very stable: the angles can be varied. Now help them to figure out how to make it more stable by using an extra piece of wood that will make a triangle someplace.

**Standards Links**  
**5.4.2, 5.4.5, 5.4.7**

## Activity (continued)

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4. Show students how to place the protractor on one side of the angle with the vertex of the angle at the 0 of the protractor. Demonstrate how to look at the scales on the protractor, choose the one that starts with the angle on the 0, and then go on that scale to go to the number for the size of the angle.
5. Help students by pointing out that angles that do not open up much are small numbers like  $30^\circ$  or  $60^\circ$  and that angles that open up a lot are numbers like  $100^\circ$  or  $125^\circ$ .
6. Have students carry out the following steps to draw a rectangle as you demonstrate:
  - Choose a particular length for a side.
  - Use the protractor to draw  $90^\circ$  angles at each end of the length.
  - Choose a length for the second side and mark that length on both of the lines you drew to make the  $90^\circ$  angles.
  - Connect those two points.
7. Ask students to check their work by measuring the final side to see if it is the same length as the first line. Mention that this is also a way to draw parallel lines.
8. Show students how to draw a triangle as follows:
  - Start with a particular length of approximately three inches.
  - Use the protractor to draw an angle of  $60^\circ$ . (Emphasize that you use the protractor scale in opposite directions for these two angles.)
  - Extend the two new sides until they intersect, measure the new angle, and measure all the sides. The angles should all be  $60^\circ$  and the sides should all be the same.
9. Draw a large triangle on the overhead and show how to measure the angles with the protractor. Be sure to show which scale to use on the protractor for each angle.

### C. Group Activity.

Have students work in groups of two or three with the BLM *Draw and Measure*.

## Questions for Review

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### Basic Concepts and Processes

During the activity, discuss the following questions with your students:



Show me how you measure this angle [*indicate an angle*].



Is this a large or small angle?



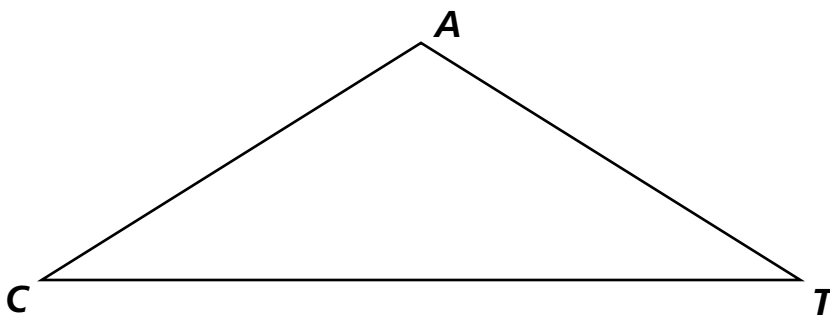
Does your number match the size of the angle?

Name: \_\_\_\_\_



Use a ruler, compass, and protractor to make the following figures:

1. Mark a point on your paper. Draw a circle using the point as its center.
2. Draw a line segment about 3 inches long. Use a protractor to draw a  $60^\circ$  angle at the left end of the line.
3. Draw a rectangle using a ruler and protractor. Make the sides of the rectangle 2 inches and  $3\frac{1}{2}$  inches.
4. Use a protractor and a ruler to make a triangle with a  $90^\circ$  and a  $30^\circ$  angle. Measure the size of the third angle.
5. Draw a triangle with all sides the same length. Measure the angles of the triangle. What do you notice about the sizes of the angles?
6. Draw a circle with radius of about 2 inches, put three points on the circle, and connect the points to make a triangle. Measure the angles of the triangle.
7. The triangle in the picture has a name: triangle CAT. Measure each angle, put the measures on the blanks, and add the numbers.



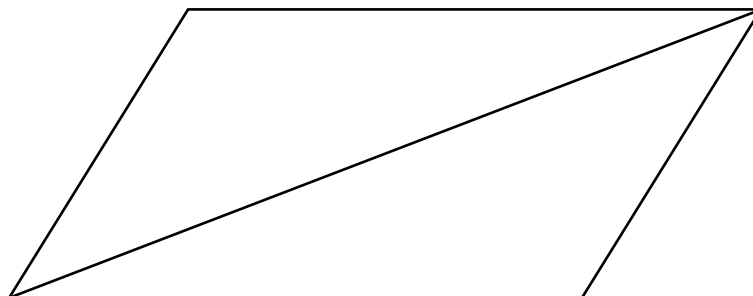
Angle C = \_\_\_\_\_

Angle A = \_\_\_\_\_

Angle T = \_\_\_\_\_

Total = \_\_\_\_\_

8. Measure and write the angles in the figure. There are eight angles.



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## Teacher Directions

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Distribute one copy of the BLM *Draw and Measure* to each student. Have students make the drawings and measurements described on the BLM.

## Answer Key

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1. – 6. Answers will vary.
7. Angle C =  $32^\circ$ , angle A =  $116^\circ$ , angle T =  $32^\circ$ , total =  $180^\circ$
8. Angle sizes are  $21^\circ$ ,  $37^\circ$ ,  $58^\circ$ , and  $122^\circ$ . Student answers may differ by 1-2°.