

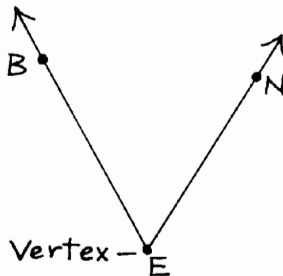
# 2

## What's the Angle?

### Measuring Angles of Straight-Sided Figures

#### What You Need to Know

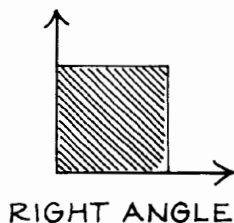
An **angle** is the figure formed when two rays that have the same endpoint or two straight lines meet. The rays or lines are the sides of the angle, and the endpoint where they meet is called the **vertex** of the angle. Three letters are used to name an angle, with the center letter being the vertex. The word *angle* can be replaced by its symbol:  $\angle$ . The name of the angle in the example is read: angle BEN or angle NEB. It is written as:  $\angle BEN$  or  $\angle NEB$ .



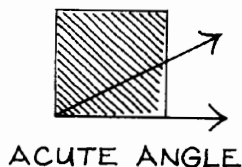
The unit used in measuring an angle is the degree. One degree is written as:  $1^\circ$ .

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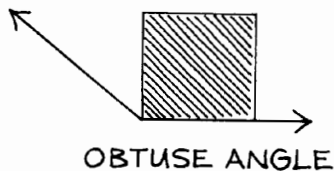
The measure of a **right angle** is 90 degrees. The corner of a rectangle is a right angle.



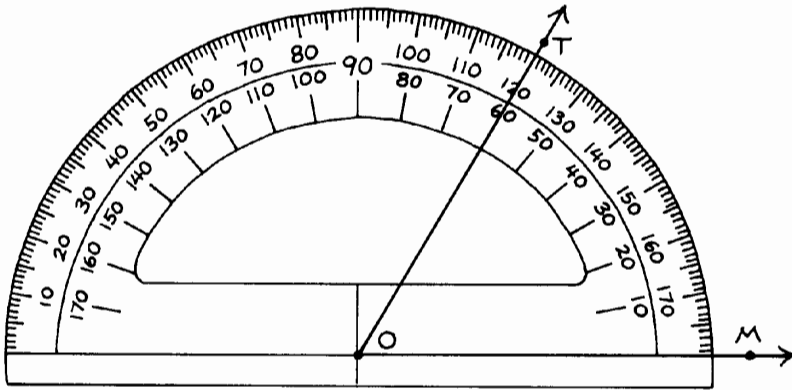
The measure of an **acute angle** is less than 90 degrees.



The measure of an **obtuse angle** is greater than 90 degrees.

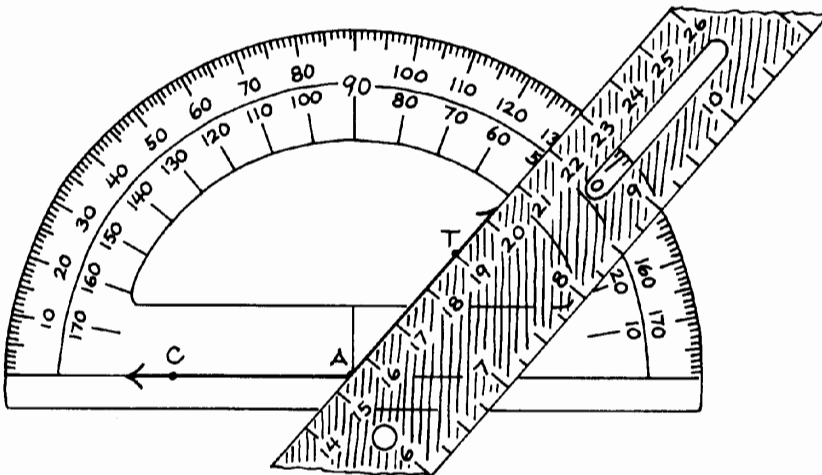


A **protractor** is an instrument used to measure angles in degrees. It is often shaped like a half circle. To measure an angle with a protractor, place the center mark of the protractor on the vertex of the angle and the straight edge on one side of the angle. The protractor will show two numbers on the curved edge where the second side crosses the scale. The sum of these two numbers will always equal 180 degrees. One of the numbers represents an acute angle, and the other an obtuse angle. If the angle is acute, use the smaller number. If it is obtuse, use the larger number. In the example, ray OT crosses the scale at



60 degrees and 120 degrees. Since the angle is acute,  $\angle TOM$  is 60 degrees.

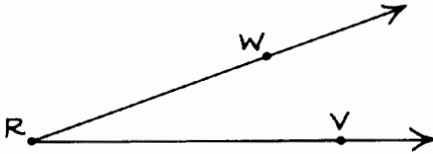
A ruler or straightedge can be used when the sides of an angle are too short to cross the scale of the protractor. Lay the edge of the ruler along the side, and read the numbers where the ruler crosses the scale of the protractor. In the diagram, the edge of the ruler crosses the scale at 50 degrees and 130 degrees. The angle is obtuse, so  $\angle CAT$  is 130 degrees.



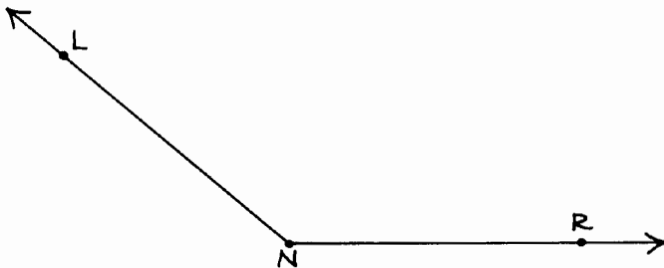
## Let's Think It Through

1. Use a protractor to measure the angles in examples A and B.

**A**



**B**



2. Write the name of the angle in example A.

### Answers

1a. *Think!*

- The angle is acute. Which of the angle choices, 20 degrees or 160 degrees, is acute?

*The angle is 20 degrees.*

b.

- The angle is obtuse. Which of the angle choices, 40 degrees or 140 degrees, is obtuse?

*The angle is 140 degrees.*

**2. Think!**

- What are the angle's three letters, with the vertex letter in the middle? WRV.
- How is the angle read? Angle WRV or angle VRW.

*The angle is written as:  $\angle WRV$  or  $\angle VRW$ .*

## Exercises

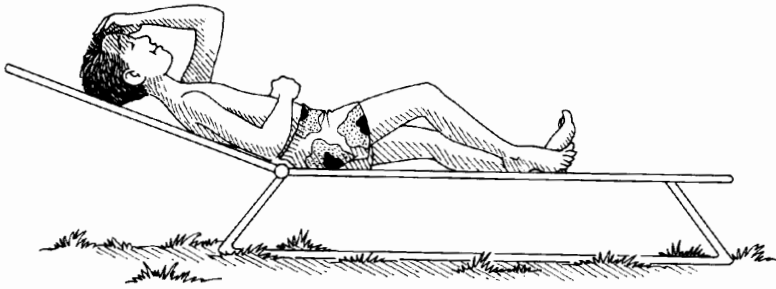
Use a protractor to measure each angle.

1. What is the angle of the bottom left corner of the picture frame?

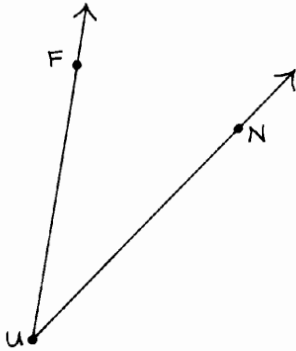


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2. Measure the angle of the lounge chair.



3. Measure and write the name of the angle.



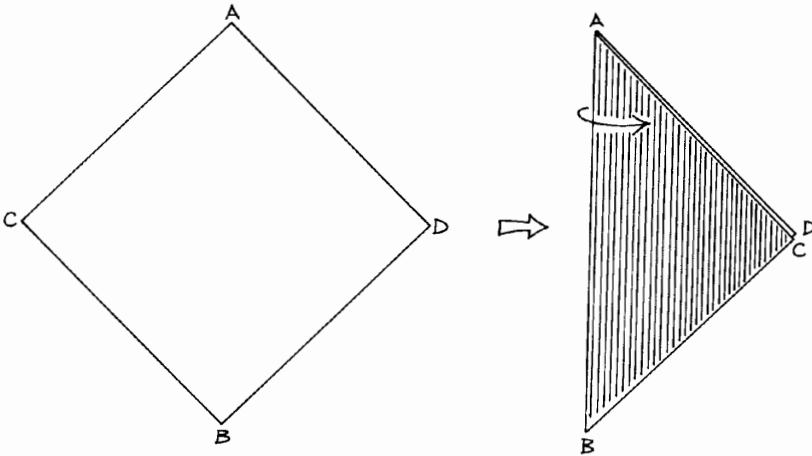
### Activity: PAPER ART

**Purpose** To fold a sheet of paper into the shape of a whale.

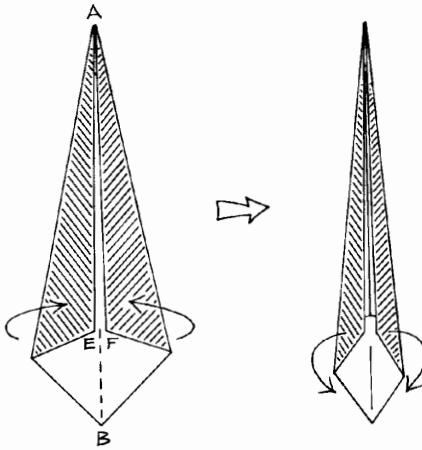
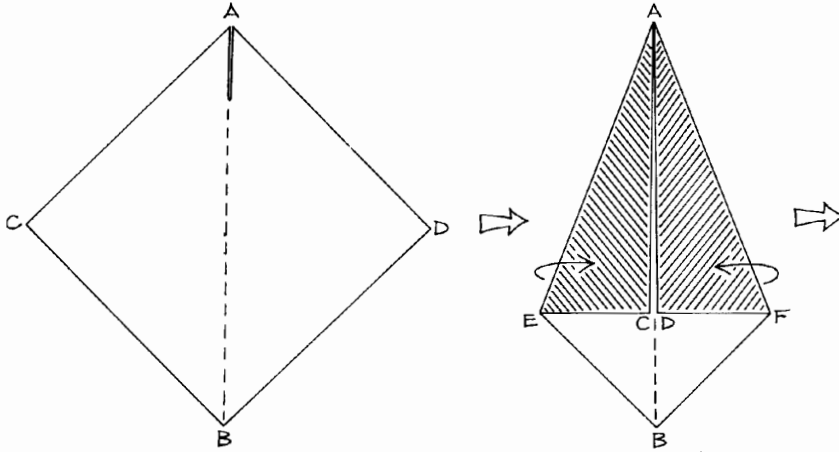
**Materials** ruler  
scissors  
typing paper  
blue crayon

## Procedure

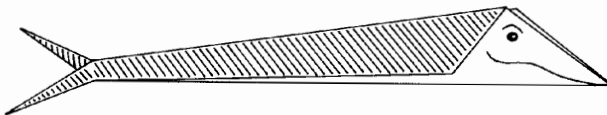
1. Measure and cut an 8-by-8-inch (20-by-20-cm) square from the paper.
2. Color one side of the paper blue.
3. Lay the paper on a table, white side up.
4. Fold the paper in half diagonally from point A to point B to form a center fold line.



5. Unfold the paper and cut about 2 inches (5 cm) down the center fold line from point A toward point B.
6. Fold the paper so that points C and D meet at the center fold line.
7. Fold the paper again, so that points E and F meet at the center fold line.



8. Refold along the fold line from point A to point B.
9. Fold the two cut ends outward.
10. Turn the paper over and draw an eye and a mouth on either side of the face, as in the diagram.



**Results** You have made a paper whale.

**Why?** Each fold in the paper is made at a new angle. The art of folding paper into shapes that look like objects is called **origami** and was originated by the Chinese about 2,000 years ago. In the seventh century this art form was brought to Japan, where Japanese magicians introduced the seeming magic of making a few simple folds to produce birds, animals, boats, and other pretty forms to delight their audiences. Origami is now a universal word for the art of paper folding.

## Solutions to Exercises

### 1. *Think!*

- The frame is a rectangle. Rectangles have what type of angles? Right angles.
- How many degrees are in a right angle?

*The bottom left corner of the frame is 90 degrees.*

### 2. *Think!*

- The angle is obtuse. Which of the angle choices, 20 degrees or 160 degrees, is obtuse?

*The angle of the lounge chair is 160 degrees.*

### 3. *Think!*

- The angle is acute. Which of the angle choices, 35 degrees or 145 degrees, is acute?

*Angle FUN ( $\angle FUN$ ) or angle NUF ( $\angle NUF$ ) is 35 degrees.*