

Name \_\_\_\_\_

## Measure and Draw Angles

**Essential Question** How can you use a protractor to measure and draw angles?



Measurement and Data—4.MD.C.6

**MATHEMATICAL PRACTICES**

MP4, MP5, MP6

### Unlock the Problem

Emma wants to make a clay sculpture of her daughter as she appears in the photo from her dance recital. How can she measure  $\angle DCE$ , or the angle formed by her daughter's arms?

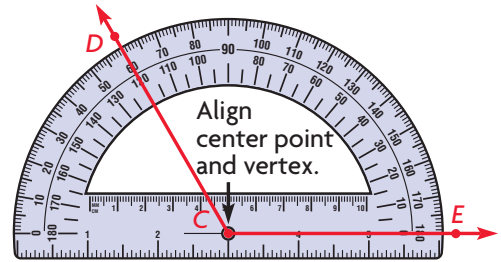


A **protractor** is a tool for measuring the size of an angle.

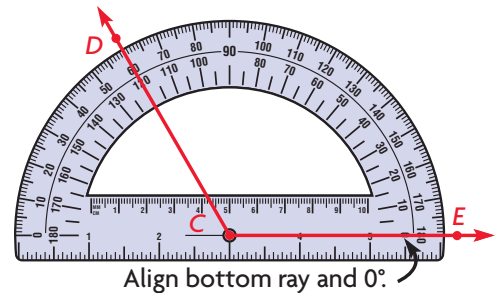
**Activity** Measure  $\angle DCE$  using a protractor.

**Materials** ■ protractor

**STEP 1** Place the center point of the protractor on vertex  $C$  of the angle.



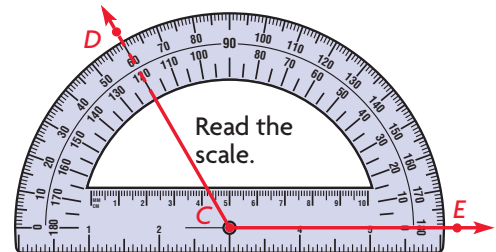
**STEP 2** Align the  $0^\circ$  mark on the scale of the protractor with ray  $CE$ .



**STEP 3** Find where ray  $CD$  intersects the same scale. Read the angle measure on that scale. Extend the ray if you need to.

$m\angle DCE =$  \_\_\_\_\_ Read  $m\angle DCE$  as "the measure of angle  $DCE$ ".

So, the angle formed by Emma's daughter's arms is \_\_\_\_\_.



**MATHEMATICAL PRACTICES 5**

**Use Appropriate Tools** Can you line up either ray of the angle with the protractor when measuring? Explain.

**Draw Angles** You can also use a protractor to draw an angle of a given measure.

**Activity** Draw  $\angle KLM$  with a measure of  $82^\circ$ .

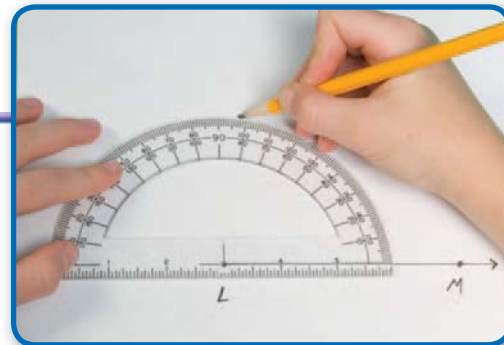
**Materials** ■ protractor

**STEP 1** Use the straight edge of the protractor to draw and label ray  $LM$ .

**STEP 2** Place the center point of the protractor on point  $L$ . Align ray  $LM$  with the  $0^\circ$  mark on the protractor.

**STEP 3** Using the same scale, mark a point at  $82^\circ$ . Label the point  $K$ .

**STEP 4** Use the straight edge of the protractor to draw ray  $LK$ .



## Share and Show



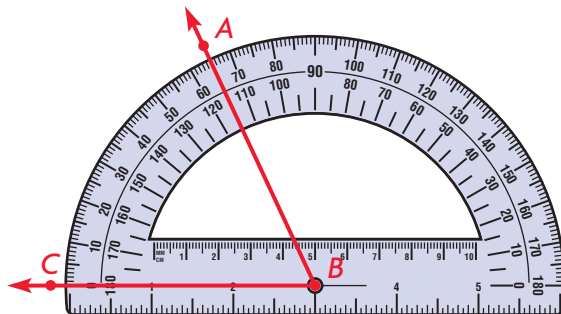
1. Measure  $\angle ABC$ .

Place the center of the protractor on point \_\_\_\_\_.

Align ray  $BC$  with \_\_\_\_\_.

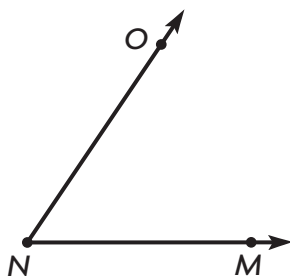
Read where \_\_\_\_\_ intersects the same scale.

So,  $m\angle ABC$  is \_\_\_\_\_.



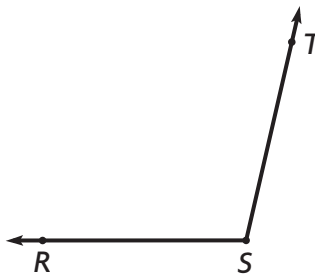
Use a protractor to find the angle measure.

2.



$m\angle ONM =$  \_\_\_\_\_

3.



$m\angle TSR =$  \_\_\_\_\_



### ERROR Alert

Be sure to use the correct scale on the protractor. Ask yourself: Is the measure reasonable?

Use a protractor to draw the angle.

4.  $170^\circ$

5.  $78^\circ$

**Math Talk**

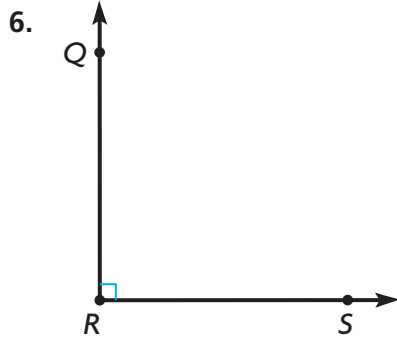
### MATHEMATICAL PRACTICES 6

**Describe** how drawing and measuring angles are similar.

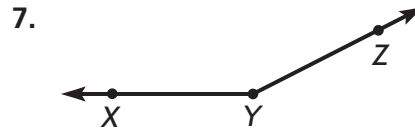
Name \_\_\_\_\_

## On Your Own

Use a protractor to find the angle measure.



$m\angle QRS =$  \_\_\_\_\_



$m\angle XYZ =$  \_\_\_\_\_

Use a protractor to draw the angle.

8.  $115^\circ$

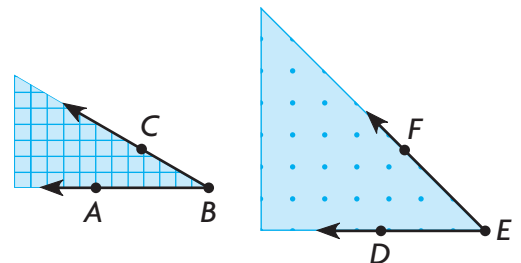
9.  $67^\circ$

Draw an example of each. Label the angle with its measure.

10. an acute angle

11. an obtuse angle

12. **GO DEEPER** Elizabeth is making a quilt with scraps of fabric. What is the difference between  $m\angle ABC$  and  $m\angle DEF$ ?



13. **THINK SMARTER** Draw an angle with a measure of  $0^\circ$ . Describe your drawing.

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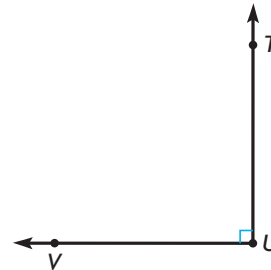
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# Problem Solving • Applications



14. **GO DEEPER** Hadley wants to divide this angle into three angles with equal measure. What will the measure of each angle be?



15. **MATHEMATICAL PRACTICE 6** Tracy measured an angle as  $50^\circ$  that was actually  $130^\circ$ . **Explain** her error.

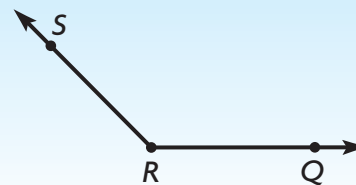
16. **THINK SMARTER** Choose the word or number to complete a true statement about  $\angle QRS$ .

$\angle QRS$  is a(n) 

acute
obtuse
right

 angle that has a measure of 

$45^\circ$
$115^\circ$
$135^\circ$



## Connect to Science

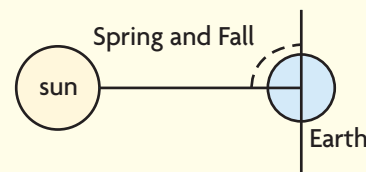
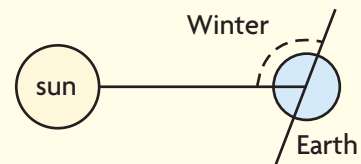
### Earth's Axis

Earth revolves around the sun yearly. The Northern Hemisphere is the half of Earth that is north of the equator. The seasons of the year are due to the tilt of Earth's axis.

Use the diagrams and a protractor for 17–18.

17. In the Northern Hemisphere, Earth's axis is tilted away from the sun on the first day of winter, which is often on December 21. What is the measure of the marked angle on the first day of winter, the shortest day of the year?
- \_\_\_\_\_
18. Earth's axis is not tilted away from or toward the sun on the first days of spring and fall, which are often on March 20 and September 22. What is the measure of the marked angle on the first day of spring or fall?
- \_\_\_\_\_

### Northern Hemisphere



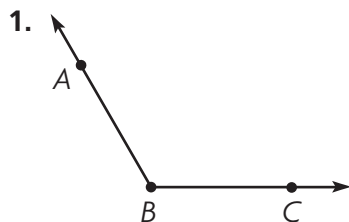
Name \_\_\_\_\_

Measure and Draw Angles

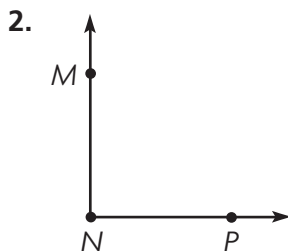


**COMMON CORE STANDARD—4.MD.C.6**  
Geometric measurement: understand concepts of angle and measure angles.

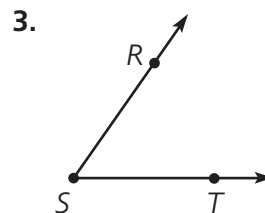
Use a protractor to find the angle measure.



$m\angle ABC = 120^\circ$



$m\angle MNP =$  \_\_\_\_\_



$m\angle RST =$  \_\_\_\_\_

Use a protractor to draw the angle.

4.  $40^\circ$

5.  $170^\circ$

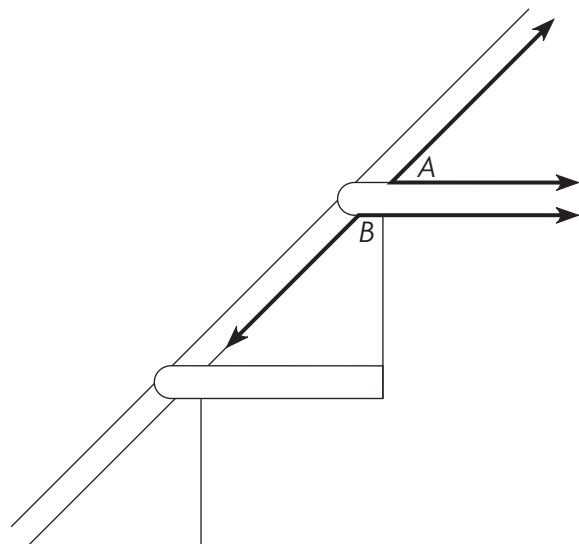
Problem Solving



The drawing shows the angles a stair tread makes with a support board along a wall. Use your protractor to measure the angles.

6. What is the measure of  $\angle A$ ? \_\_\_\_\_

7. What is the measure of  $\angle B$ ? \_\_\_\_\_



8. **WRITE** *Math* Find an angle at home. Measure the angle.

Record the measure. Classify the angle.

\_\_\_\_\_

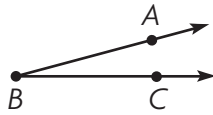
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

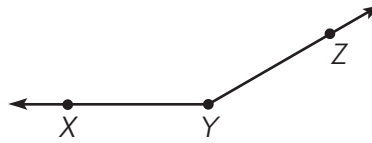
## Lesson Check (4.MD.C.6)

1. What is the measure of  $\angle ABC$ ?



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2. What is the measure of  $\angle XYZ$ ?



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## Spiral Review (4.NBT.B.6, 4.NF.B.3c, 4.MD.C.5a, 4.G.A.1)

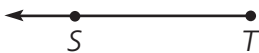
3. Derrick earned \$1,472 during the 4 weeks he had his summer job. If he earned the same amount each week, how much did he earn each week?

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4. Arthur baked  $1\frac{7}{12}$  dozen muffins. Nina baked  $1\frac{1}{12}$  dozen muffins. How many dozen muffins did they bake?

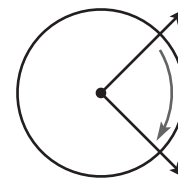
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5. Trisha drew the figure below. What figure did she draw?



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6. Measure and describe the turn shown by the angle. Be sure to tell about the size and direction of the turn.



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