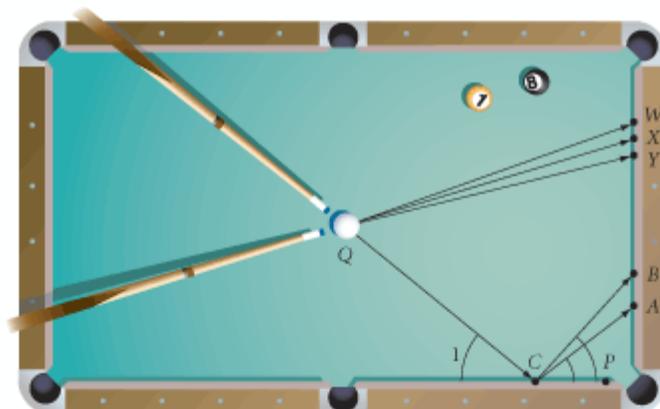


Use your protractor to study these shots.

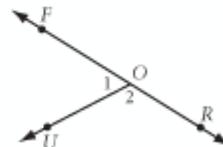
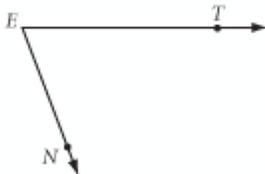


- Step 1 Use your protractor to find the measure of  $\angle 1$ . Which is the correct outgoing angle? Which point— $A$  or  $B$ —will the ball hit?
- Step 2 Which point on the cushion— $W$ ,  $X$ , or  $Y$ —should the white ball hit so that the ray of the outgoing angle passes through the center of the 8-ball?
- Step 3 Compare your results with your group members' results. Does everyone agree?
- Step 4 How would you hit the white ball against the cushion so that the ball passes over the same spot on the way back?
- Step 5 How would you hit the ball so that it bounces off three different points on the cushions without ever touching cushion  $CP$ ?



### EXERCISES

1. Name each angle in three different ways.



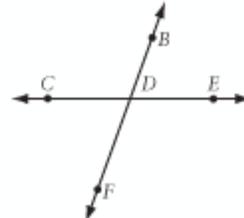
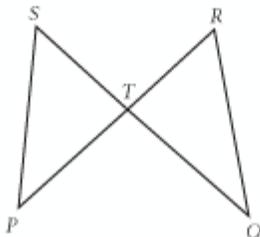
For Exercises 2–4, draw and label each angle.

2.  $\angle TAN$

3.  $\angle BIG$

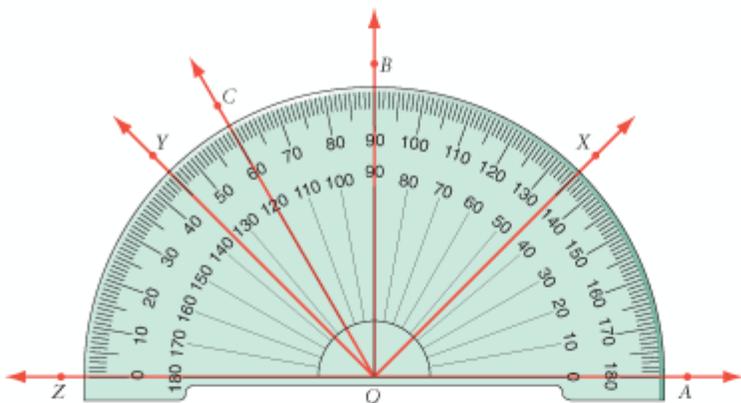
4.  $\angle SML$

5. For each figure at right, list the angles that you can name using only the vertex letter.



6. Draw a figure that contains at least three angles and requires three letters to name each angle.

For Exercises 7–14, find the measure of each angle to the nearest degree.

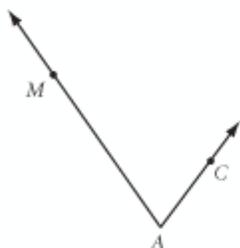


If an exercise has an **h** at the end, you can find a hint to help you in Hints for Selected Exercises at the back of the book.

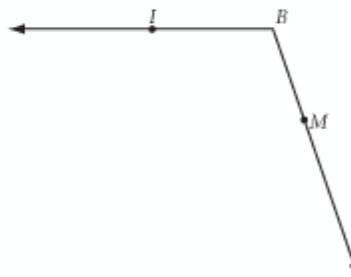
7.  $m\angle AQB \approx ?$       8.  $m\angle AQC \approx ?$       9.  $m\angle XQA \approx ?$       10.  $m\angle AQY \approx ?$   
 11.  $m\angle ZQY \approx ?$       12.  $m\angle ZQX \approx ?$       13.  $m\angle CQB \approx ?$  **h**      14.  $m\angle XQY \approx ?$   
 15. **Adjacent Angles**  $\angle XQA$  and  $\angle XQY$  share a vertex and a side. Taken together they form the larger angle  $\angle AQY$ . Compare their measures. Does  $m\angle XQA + m\angle XQY = m\angle AQY$ ?

For Exercises 16–20, use your protractor to find the measure of the angle to the nearest degree.

16.  $m\angle MAC \approx ?$



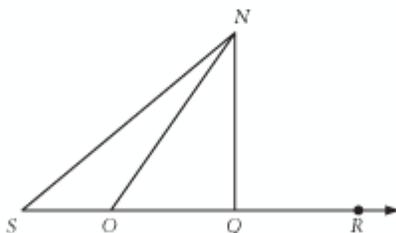
17.  $m\angle IBM \approx ?$



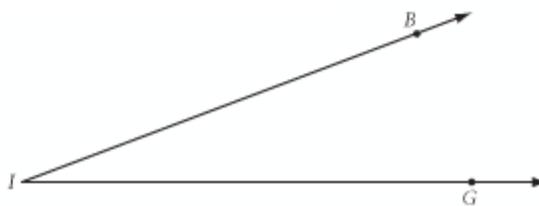
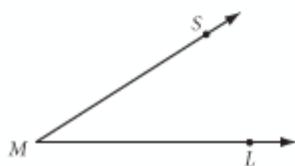
18.  $m\angle S \approx ?$

19.  $m\angle SON \approx ?$

20.  $m\angle NOR \approx ?$



21. Which angle below has the greater measure,  $\angle SML$  or  $\angle BIG$ ? Why?



For Exercises 22–24, use your protractor to draw angles with these measures. Label them.

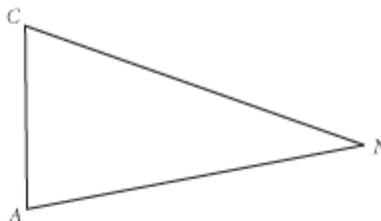
22.  $m\angle A = 44^\circ$

23.  $m\angle B = 90^\circ$

24.  $m\angle CDE = 135^\circ$

25. Use your protractor to draw the angle bisector of  $\angle A$  in Exercise 22 and the angle bisector of  $\angle D$  in Exercise 24. Use markings to show that the two halves are congruent.

26. Copy triangle  $CAN$  shown at right. Use your protractor to find the angle bisector of  $\angle A$ . Label the point where it crosses  $CN$  point  $Y$ . Use your ruler to find the midpoint of  $CN$  and label it  $D$ . Are  $D$  and  $Y$  the same point?



For Exercises 27–29, draw a clock face with hands to show these times.

27. 3:30

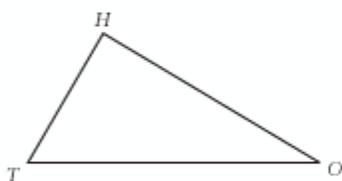
28. 3:40

29. 3:15

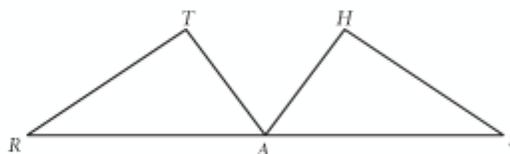
30. Give an example of a time when the angle made by the hands of the clock will be greater than  $90^\circ$ .

For Exercises 31–34, copy each figure and mark it with all the given information.

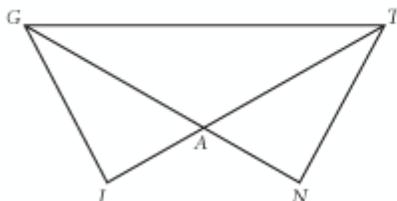
31.  $TH = 6$   
 $m\angle THO = 90^\circ$   
 $OH = 8$



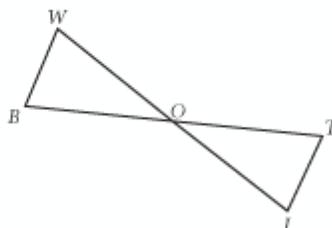
32.  $RA = SA$   
 $m\angle T = m\angle H$   
 $RT = SH$



33.  $AT = AG$        $\angle AGT \cong \angle ATG$   
 $AI = AN$        $GI = TN$

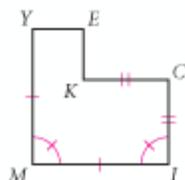


34.  $\overline{BW} \cong \overline{TI}$        $\angle WBT \cong \angle ITB$   
 $\overline{WO} \cong \overline{IO}$        $\angle BWO \cong \angle TIO$



For Exercises 35 and 36, write down what you know from the markings. Do not use your protractor or your ruler.

35.  $MI = ?$   
 $IC = ?$   
 $m\angle M = ?$



36.  $\angle MEO \cong ?$   
 $\angle SUE \cong ?$   
 $OU = ?$

