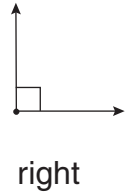
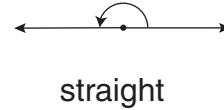
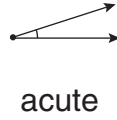
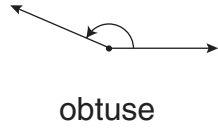
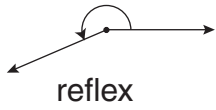


# 7

# Practice . . . Measuring Angles with a Protractor

Study these types of angles.



**Directions:** Use the information on page 29 and your protractor to measure the number of degrees in each angle and to name the type of angle represented.

1. \_\_\_\_\_ °  
 \_\_\_\_\_

2. \_\_\_\_\_ °  
 \_\_\_\_\_

3. \_\_\_\_\_ °  
 \_\_\_\_\_

4. \_\_\_\_\_ °  
 \_\_\_\_\_

5. \_\_\_\_\_ °  
 \_\_\_\_\_

6. \_\_\_\_\_ °  
 \_\_\_\_\_

7. \_\_\_\_\_ °  
 \_\_\_\_\_

8. \_\_\_\_\_ °  
 \_\_\_\_\_

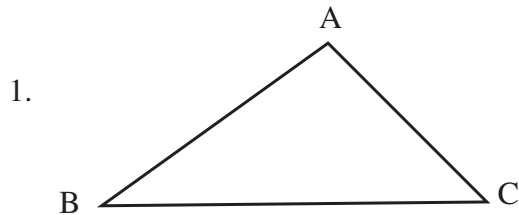
9. \_\_\_\_\_ °  
 \_\_\_\_\_

10. \_\_\_\_\_ °  
 \_\_\_\_\_

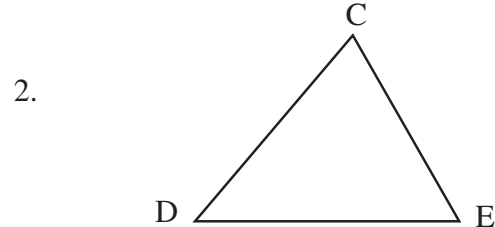
**Facts to Know**

- The middle letter names the location of each angle. Angle ABC is at point B. Angle CEF is at point E.
- The internal angles of a triangle should total  $180^\circ$ .

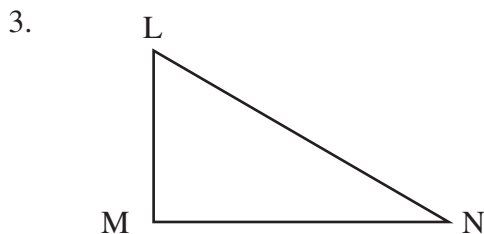
**Directions:** Use the information above and on page 29 to measure each angle in these triangles. List the degrees for each angle and the total degrees for each triangle.



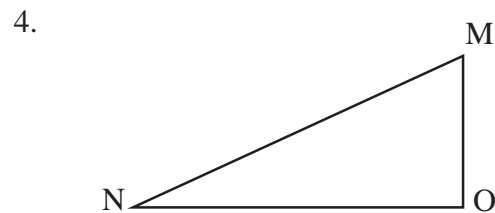
$$\begin{aligned} \angle BAC &= \underline{\hspace{2cm}}^\circ \\ \angle CBA &= \underline{\hspace{2cm}}^\circ \\ \angle ACB &= \underline{\hspace{2cm}}^\circ \\ \triangle ABC &= \underline{\hspace{2cm}}^\circ \end{aligned}$$



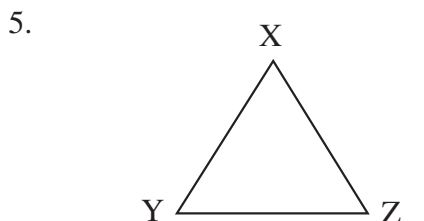
$$\begin{aligned} \angle CDE &= \underline{\hspace{2cm}}^\circ \\ \angle ECD &= \underline{\hspace{2cm}}^\circ \\ \angle DEC &= \underline{\hspace{2cm}}^\circ \\ \triangle DEC &= \underline{\hspace{2cm}}^\circ \end{aligned}$$



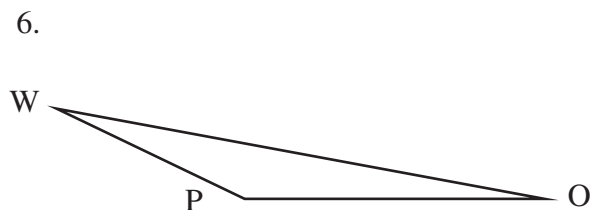
$$\begin{aligned} \angle LMN &= \underline{\hspace{2cm}}^\circ \\ \angle MNL &= \underline{\hspace{2cm}}^\circ \\ \angle MLN &= \underline{\hspace{2cm}}^\circ \\ \triangle LMN &= \underline{\hspace{2cm}}^\circ \end{aligned}$$



$$\begin{aligned} \angle MNO &= \underline{\hspace{2cm}}^\circ \\ \angle OMN &= \underline{\hspace{2cm}}^\circ \\ \angle MON &= \underline{\hspace{2cm}}^\circ \\ \triangle MNO &= \underline{\hspace{2cm}}^\circ \end{aligned}$$



$$\begin{aligned} \angle XYZ &= \underline{\hspace{2cm}}^\circ \\ \angle ZXY &= \underline{\hspace{2cm}}^\circ \\ \angle YZX &= \underline{\hspace{2cm}}^\circ \\ \triangle XYZ &= \underline{\hspace{2cm}}^\circ \end{aligned}$$



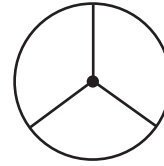
$$\begin{aligned} \angle WPO &= \underline{\hspace{2cm}}^\circ \\ \angle POW &= \underline{\hspace{2cm}}^\circ \\ \angle PWO &= \underline{\hspace{2cm}}^\circ \\ \triangle WPO &= \underline{\hspace{2cm}}^\circ \end{aligned}$$

**Sample**

A circle has  $360^\circ$ .

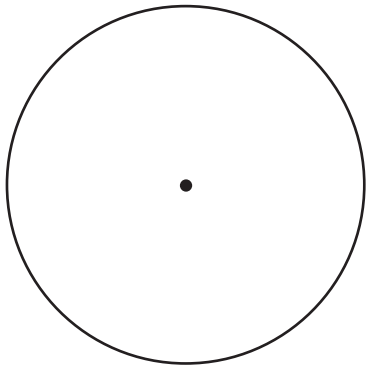
This circle has been divided into 3 sections.

Each section is  $120^\circ$ .

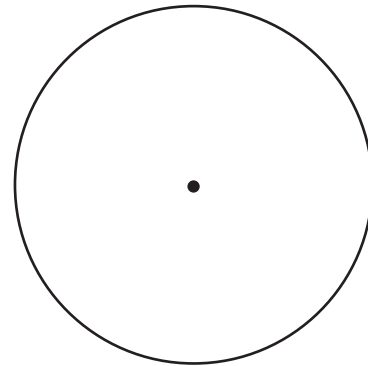


**Directions:** Use the information on page 29 and a protractor to divide each circle as instructed.

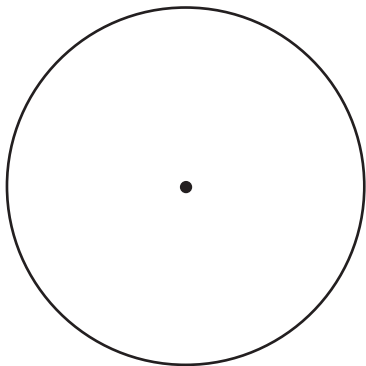
1. 4 sections/ $90^\circ$  each



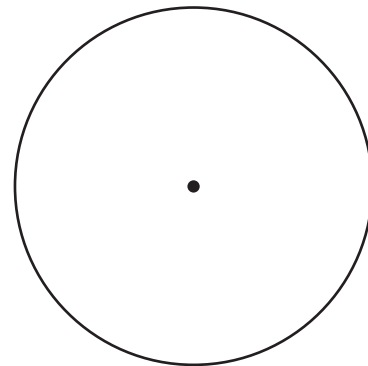
2. 6 sections/ $60^\circ$  each



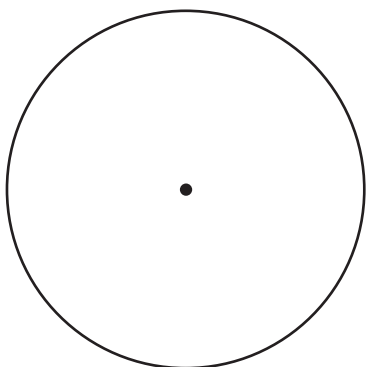
3. 8 sections/ $45^\circ$  each



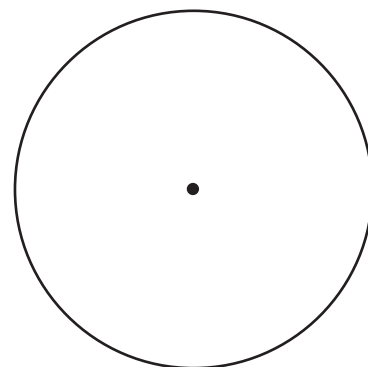
4. 3 sections/ $120^\circ$  each



5. 9 sections/ $40^\circ$  each



6. 12 sections/ $30^\circ$  each



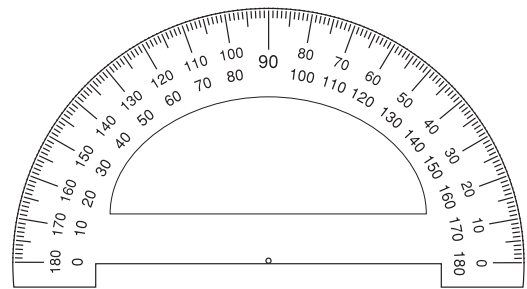
## Facts to Know

- A protractor is used to measure the exact size of an angle in terms of the number of degrees between  $0^\circ$  and  $180^\circ$ .
- There are usually two sets of numbers on a protractor—one set running from left to right and the other set from right to left.
- These two sets of numbers make it easier to line up the protractor on any angle, regardless of the direction of the angle.
- The halfway point of every protractor is  $90^\circ$ . It is only written once.

## Using the Protractor

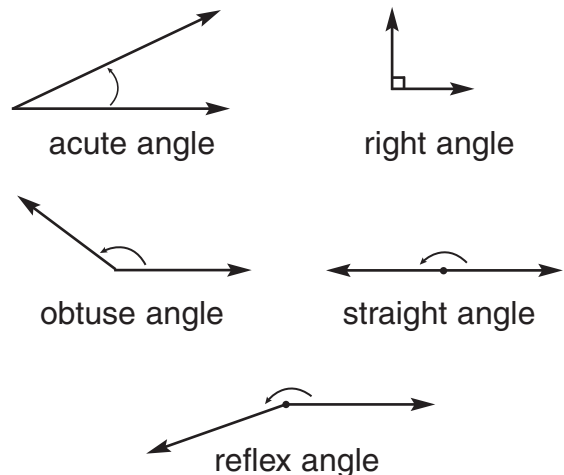
To measure an angle with a protractor do the following:

1. Place the circle at the bottom center of the protractor (or comparable vertex marker) directly on the vertex (point) of the angle.
2. Carefully line up the black line at the bottom of the protractor (or comparable baseline indicator) along the bottom ray of the angle.
3. Find the pair of numbers where the top ray of the angle intersects the degree markings on the protractor.
4. Determine whether the angle is acute, obtuse, right, or straight.
5. Decide which number fits this angle.



## Angle Names and Facts

- Acute angles are less than  $90^\circ$ . Acute angles can face in any direction.
- Right angles are exactly  $90^\circ$ . Right angles can face in any direction.
- Obtuse angles are more than  $90^\circ$  but less than  $180^\circ$ . Obtuse angles can face in any direction.
- A straight angle is exactly  $180^\circ$ .
- A reflex angle is more than  $180^\circ$  and less than  $360^\circ$ .



## Using the Protractor with a Circle

To divide a circle with a protractor do the following:

1. Draw a radius from the exact center of the circle to the circumference.
2. Line up the protractor, using the radius as one of the rays of the angle.
3. Mark the number of degrees you want the angle to be.
4. Draw another radius from this mark to the center point.



# Answer Key

## Page 6

1.  $5 \frac{11}{16}$ "
2.  $2 \frac{5}{16}$ "
3.  $6 \frac{3}{4}$ "
4.  $6 \frac{7}{16}$ "
- 5.–18. Answers will vary.

## Pages 7 and 8

Answers will vary.

## Page 10

1. 18.2 cm
2. 26.2 cm
3.  $13 \frac{1}{2}$  cm
4.  $16 \frac{1}{2}$  ft.
5.  $15 \frac{1}{4}$  in.
6.  $18 \frac{3}{8}$  cm.
- 7.–10. Answers will vary.

## Page 11

1. 15.6 cm
2.  $11 \frac{1}{4}$  in.
3. 24.4 m
4.  $18 \frac{3}{4}$  ft.
5. 74.4 m
6. 64 yd.
7. 137.4 cm
8. 105.3 m

## Page 12

1. 19.1 m
2. 22.6 m
3. 26 in.
4.  $20 \frac{1}{2}$  ft.
5. 25.12 m
6. 37.68 in.
7. 31.4 cm
8. 21.98 m

## Page 14

1.  $41 \text{ m}^2$
2.  $126 \text{ yd.}^2$
3.  $67.5 \text{ cm}^2$
4.  $6.08 \text{ m}^2$
5.  $34 \text{ ft.}^2$
6.  $16 \frac{1}{4} \text{ in.}^2$
7.  $3,680 \text{ m}^2$
8.  $7,500 \text{ mm}^2$

## Page 15

1.  $24 \text{ ft.}^2$
2.  $45 \text{ yd.}^2$
3.  $11.66 \text{ cm}^2$
4.  $27.72 \text{ cm}^2$

5.  $405 \text{ in.}^2$
6.  $49.14 \text{ m}^2$
7.  $116.39 \text{ cm}^2$
8.  $86.45 \text{ m}^2$

## Page 16

1.  $50.24 \text{ m}^2$
2.  $78.5 \text{ cm}^2$
3.  $314 \text{ cm}^2$
4.  $452.16 \text{ cm}^2$
5.  $1,256 \text{ cm}^2$
6.  $615.44 \text{ ft.}^2$
7.  $706.5 \text{ in.}^2$
8.  $1,962.5 \text{ m}^2$

## Page 18

1.  $105 \text{ m}^3$
2.  $720 \text{ ft.}^3$
3.  $343 \text{ cm}^3$
4.  $165 \text{ in.}^3$
5.  $240 \text{ yd.}^3$
6.  $67.032 \text{ m}^3$
7.  $92.736 \text{ m}^3$
8.  $694.512 \text{ cm}^3$
9.  $1,728 \text{ ft.}^3$
10.  $86 \frac{6}{8} \text{ ft.}^3$

## Page 19

1.  $351.68 \text{ m}^3$
2.  $169.56 \text{ cm}^3$
3.  $282.6 \text{ cm}^3$
4.  $18.84 \text{ in.}^3$
5.  $50,240 \text{ cm}^3$
6.  $1,538.6 \text{ ft.}^3$

## Pages 20–23

Answers will vary.

## Page 24

1. 6 lbs. 4 oz.
2. 1 ton 300 lbs.
3. 4,000 cassettes
4. 100 pills
5. 100,000 pills
6. 2,000 dictionaries
7. 12,000 staplers
8. 100 people
9. 500 mg or  $\frac{1}{2}$  g
10. 220 kg
11. 4,400 kg
12. 2,200 clips
13. 6,400 calculators
14. 40 cameras

## Page 26

1. 8 fl. oz.
2. 16 fl. oz.
3. 32 fl. oz.
4. 48 fl. oz.
5. 64 fl. oz.
6. 72 fl. oz.
7. 32 fl. oz.
8. 64 fl. oz.
9. 160 fl. oz.
10. 96 fl. oz.
11. 4 qt.
12. 16 qt.
13. 128 fl. oz.
14. 60 qt.
15. 1,920 fl. oz.
16. 16 fl. oz.
17. 48 fl. oz.
18. 112 fl. oz.
19. 40 pints
20. 176 cups
21. 120 pints
22. 1,280 fl. oz.
23. 34 cups
24. 176 fl. oz.
25. 344 fl. oz.

## Page 27

1. 30 mL
2. 240 mL
3. 1,000 mL
4. 960 mL
5. 40 mL
6. 480 mL
7. 3,840 mL
8. 3.84 L
9. 38.4 L
10. 69.1 L
11. 960 L
12. 96 L
13. 96 L
14. 1920
15. 360 L

## Page 28

1. 2 qt.
2. 12 mL
3. 80 mL
4. 336 mL
5. 50 pennies
6. 432 mL

7. 24 fl. oz.
8. 384 mL
9. 128 quarters
10. 19.2 L
11. 8 times
12. 48 cups

## Page 30

1.  $40^\circ$  acute
2.  $120^\circ$  obtuse
3.  $180^\circ$  straight
4.  $90^\circ$  right
5.  $50^\circ$  acute
6.  $130^\circ$  obtuse
7.  $250^\circ$  reflex
8.  $215^\circ$  reflex
9.  $90^\circ$  right
10.  $80^\circ$  acute

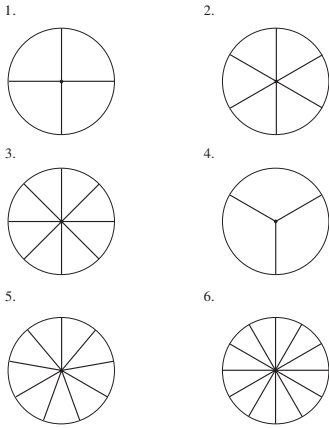
## Page 31

1.  $\angle BAC = 100^\circ$   
 $\angle CBA = 35^\circ$   
 $\angle ACB = 45^\circ$   
 $\triangle ABC = 180^\circ$
2.  $\angle CDE = 50^\circ$   
 $\angle ECD = 70^\circ$   
 $\angle DEC = 60^\circ$   
 $\triangle DEC = 180^\circ$
3.  $\angle LMN = 90^\circ$   
 $\angle MNL = 30^\circ$   
 $\angle MLN = 60^\circ$   
 $\triangle LMN = 180^\circ$
4.  $\angle MNO = 25^\circ$   
 $\angle OMN = 65^\circ$   
 $\angle MON = 90^\circ$   
 $\triangle MNO = 180^\circ$
5.  $\angle XYZ = 60^\circ$   
 $\angle ZXY = 60^\circ$   
 $\angle YZX = 60^\circ$   
 $\triangle XYZ = 180^\circ$
6.  $\angle WPO = 154^\circ$   
 $\angle POW = 11^\circ$   
 $\angle PWO = 15^\circ$   
 $\triangle WPO = 180^\circ$



# Answer Key

## Page 32



## Page 34

- 3 hr 35 min
- 1 hr 40 min
- 6 hr 25 min
- 6 hr 55 min
- 2 hr 35 min
- 8 hr 6 min
- 7 hr 56 min
- 2 hr 16 min
- 190 days 13 hr 32 min
- 91 days 3 hr 39 min
- 34 wk 3 days 14 hr 40 min
- 15 wk 6 days 5 hr 6 min
- 26 days 12 hr 34 min
- 13 days 19 hr 25 min

## Page 35

- Feb./Mar.
- Ending in 29, the first month must be February.
- Feb. 19th
- Apr. 4th
- Mar. 18th
- 5
- 31 days
- 275 days
- Mar. 1
- December 26th
- April 23rd
- Monday

## Page 36

(dates as of year 2000)

- 378 yr.
- 3,800 yr.
- 369 yr.
- 187 yr.
- 3,000 yr.
- 2,100 yr.
- 383 yr.
- 334 yr.

## Page 38

- 70° F
- 32° F
- 98° F
- 20° F
- 50° F
- 98.6° F; 14° F
- 52° F
- 32° F
- 180° F
- 113.4° F
- 4.4° F
- 72° F
- 29.4° F
- 112° F

## Page 39

- 20° C
- 33° C
- 98° C
- 50° C
- 10° C
- 20° C
- 122° F  
uncomfortably hot
- 0° C
- 22° C
- 40° C
- 50° C
- 89° C
- C. short sleeves
- E. swim suit
- B. ice skates
- D. light jacket
- A. heavy parka

## Page 40

- 4° C
- 20° C
- 38° C
- 27° C
- 0° C
- 100° C
- 77° F
- 50° F
- 99° F (98.6° F)
- 167° F
- 86° F
- 140° F

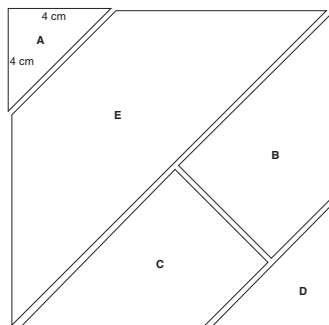
## Page 41

- 9 m.p.h.
- 45 miles
- 50 m.p.h.
- 43.75 m.p.h.
- 11.2 m.p.h.
- 168 miles
- 270 miles
- 578.5 m.p.h.
- 107.8 m.p.h.
- 135 m.p.h.

## Page 42

- 10 hr.
- 3 hr.
- 2.5 hr.
- 7 m.p.h.
- 7.5 hr.
- 52.5 m.p.h.
- 787.5 hr.
- 117.5 hr.
- 13.5 hr.
- 15 hr.

## Page 43



Area of square = 144 cm<sup>2</sup>

Area of parts (A + B + C + D + E) = 144 cm<sup>2</sup>

Possible steps to finding the areas of each part:

To find the area of section E (64 cm<sup>2</sup>), subtract the area of A (8 cm<sup>2</sup>) from the area of one-half the square (72 cm<sup>2</sup>).

Section B and section C are congruent. Sections B, C, and D make up one-half the square.

To find the area of B (30), subtract the area of D (12 cm<sup>2</sup>) from the areas of B + C + D (72 cm<sup>2</sup>), and then divide that difference by 2.

Section areas in square centimeters: A = 8, B = 30, C = 30, D = 12, E = 64

The sum of the parts (8 + 30 + 30 + 12 + 64) = the whole (144).

## Pages 44 and 45

Answers will vary.

## Page 46

- 944 mi.<sup>2</sup>
- 387,823 mi.<sup>2</sup>
- 654,879 mi.<sup>2</sup>
- Illinois
- Montana
- 7. Answers will vary.