Name _____ Date _____ Class _____

LESSON 12-2

Problem Solving

Arcs and Chords

1. Circle D has center $(-2, -7)$ and radius 7. What is the measure, in degrees, of the major arc that passes through points $H(-2, 0)$, $J(5, -7)$, and $K(-9, -7)$?

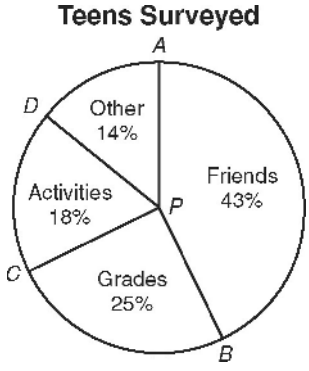
_____

2. A circle graph is composed of sectors with central angles that measure $3x°$, $3x°$, $4x°$, and $5x°$. What is the measure, in degrees, of the smallest minor arcs?

_____

Use the following information for Exercises 3 and 4.

The circle graph shows the results of a survey in which teens were asked what says the most about them at school. Find each of the following.



3. $m\overset{\frown}{AB}$

_____

4. $m\angle APC$

_____

Choose the best answer.

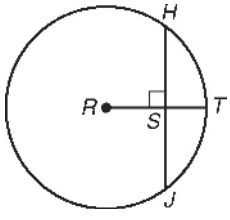
5. Students were asked to name their favorite cafeteria food. The results of the survey are shown in the table. In a circle graph showing these results, which is closest to the measure of the central angle for the section representing chicken tenders?

Favorite Lunch	Number of Students
Pizza	108
Chicken tenders	75
Taco salad	90
Other	54

A 21° C 83°

B 75° D 270°

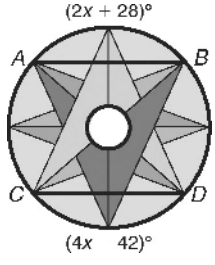
6. The diameter of $\odot R$ is 15 units, and $HJ = 12$ units. What is the length of $\overline{ST}$?



F 2.1 units H 4.5 units

G 3 units J 9.6 units

7. In the stained glass window, $\overline{AB} \cong \overline{CD}$ and $\overline{AB} \parallel \overline{CD}$. What is $m\overset{\frown}{CBD}$?



A 35° C 98°

B 70° D 262°

$m\angle QUR$ are each equal to $\frac{1}{2}(180 - m\angle RQU)$. It is given that $\overset{\frown}{RSU} \cong \overset{\frown}{RTU}$, so $m\overset{\frown}{RSU} = m\overset{\frown}{RTU}$. The measure of an arc is equal to the measure of its central angle, so $m\angle RPU = m\angle RQU$. Substitution shows that $m\angle PUR = m\angle PRU = m\angle QRU = m\angle QUR$. $\overline{RU} \cong \overline{RU}$ by the Reflexive Property of Congruence. So $\triangle PRU \cong \triangle QRU$ by SAS. By CPCTC, $\overline{PR} \cong \overline{QR}$ and circles with congruent radii are congruent circles, so $\odot P \cong \odot Q$.

3. 60°
4. 19.2°
5. 53.1°
6. 90°
7. 103.5°
8. 180°
9. $0.2r$
10. $0.8r$
11. $1.9r$

Reteach

1. 63°
2. 117°
3. 130°
4. 140°
5. 75°
6. 225°
7. 88°
8. 21
9. 16.0
10. 30.0

Challenge

1. 86°
2. 47°
3. 43°
4. 14 cm
5. a. $\sin 43° = \frac{AD}{14}$

   b. AD ≈ 9.5 cm

   c. AB ≈ 19.1 cm
6. 1.9 in.
7. 3.0 m
8. 1.3 ft
9. $\ell = d\left(\sin\left[\frac{n}{2}\right]^\circ\right)$

Students' answers may vary slightly.

10. S ≈ 5.9 in.
11. P ≈ 29.4 in.
12. a ≈ 4.1 in.
13. A ≈ 59.4 in^2
14. Formulas may vary in form.

$$A = \frac{1}{4}nd^2\left(\cos\left[\frac{180}{n}\right]^\circ\right)\left(\sin\left[\frac{180}{n}\right]^\circ\right)$$

Problem Solving

1. 270°
2. 72°
3. 154.8°
4. 115.2°
5. C
6. G
7. D

Reading Strategies

1. 60°
2. 360°
3. central angles
4. 32°
5. 263°
6. 328°
7. 295°
8. 32°
9. 65°

12-3 SECTOR AREA AND ARC LENGTH

Practice A

1. $\pi r^3\left(\frac{m^\circ}{360^\circ}\right)$
2. $2\pi r\left(\frac{m^\circ}{360^\circ}\right)$
3. 9π mm^2; 28.27 mm^2
4. 27π mi^2; 84.82 mi^2
5. 982 yd^2
6. 1173 yd^2
7. 25π in^2
8. 50 in^2
9. 28.54 in^2
10. 4π cm; 12.57 cm
11. 3π km; 9.42 km

Practice B

1. sector *BAC* 126 π mm^2; 395.84 mm^2
2. sector *UTV* 30 π in^2; 94.25 in^2
3. sector *KJL* π ft^2; 3.14 ft^2
4. sector *FEG* 100π m^2; 314.16 m^2
5. 4.54 in^2
6. 10.96 km^2
7. 24.47 yd^2
8. 0.29 cm^2
9. 9.83 mi^2
10. π ft; 3.14 ft
11. 14π m; 43.98 m
12. $\frac{\pi}{2}$ mi; 1.57 mi
13. 10π mm; 31.42 mm

Practice C

1. Possible answer: The area of a sector of a circle with radius r and central angle m is $A = \pi r^2\left(\frac{m}{360}\right)$. Half this area is