Answers for Lesson 10-3, pp. 548–550 Exercises

1. $m\angle 1 = 120; m\angle 2 = 60; m\angle 3 = 30$

2. $m\angle 4 = 90; m\angle 5 = 45; m\angle 6 = 45$

3. $m\angle 7 = 60; m\angle 8 = 30; m\angle 9 = 60$

4. 2144.475 cm^2 **5.** 2851.8 ft^2 **6.** 12,080 $in.^2$

7. 2475 $in.^2$ **8.** 1168.5 m^2 **9.** 2192.4 cm^2

10. 841.8 ft^2 **11.** 27.7 $in.^2$ **12.** 93.5 m^2

13. 210 $in.^2$ **14.** 72 cm^2 **15.** $384\sqrt{3}$ $in.^2$

16. $162\sqrt{3}$ m^2 **17.** $75\sqrt{3}$ m^2 **18.** $12\sqrt{3}$ $in.^2$

19. **a.** 72
b. 54

20. **a.** 45
b. 67.5

21. **a.** 40
b. 70

22. **a.** 30
b. 75

23. 73 cm^2

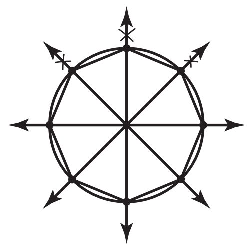
24. D

25. **a.** 9.1 in.
b. 6 in.
c. 3.7 in.
d. Answers may vary. Sample: About 4.6 in.; the length of a side of a pentagon should be between 3.7 in. and 6 in.

26. $m\angle 1 = 36; m\angle 2 = 18; m\angle 3 = 72$

27. The apothem is one leg of a rt. △ and the radius is the hypotenuse.

28. a–c.



regular octagon

d. Construct a 60° angle with vertex at circle's center.

29. $600\sqrt{3}$ m^2

30. Check students' work.

31. 128 cm^2

32. $24\sqrt{3}$ cm^2, 41.6 cm^2

33. $900\sqrt{3}$ m^2, 1558.8 m^2

34. a. $b = s; h = \frac{\sqrt{3}}{2}s$

$A = \frac{1}{2}bh$

$A = \frac{1}{2}s \cdot \frac{\sqrt{3}}{2}s$

$A = \frac{1}{4}s^2\sqrt{3}$

b. apothem $= \frac{s\sqrt{3}}{6}$;

$A = \frac{1}{2}ap = \frac{1}{2}\left(\frac{s\sqrt{3}}{6}\right)(3s)$

$= \frac{1}{4}s^2\sqrt{3}$

35. The apothem is ⊥ to a side of the pentagon. Two right △s are formed with the radii of the pentagon. So the △s are ≅ by HL. Therefore, the ∠s formed by the apothem and radii are ≅ by CPCTC, and the apothem bisects the vertex ∠.

36. For regular n-gon $ABCDE \ldots$, let P be the intersection of the bisectors of $\angle ABC$ and $\angle BCD$. $\overline{BC} \cong \overline{DC}$, $\angle BCP \cong \angle DCP$, and $\overline{CP} \cong \overline{CP}$, so $\triangle BCP \cong \triangle DCP$, and $\angle CBP \cong \angle CDP$ by CPCTC. Since $\angle BCP$ is half the size of $\angle ABC$ and $\angle ABC \cong \angle CDE$, $\angle CDP$ is half the size of $\angle CDE$. By a similar argument, P is on the bisector of each $\angle$ around the polygon.

The smaller angles formed by the bisectors are all $\cong$. By the Conv. of the Isosc. $\triangle$ Thm., each of $\triangle APB$, BPC, CPD, and so on are isosceles with $\overline{AP} = \overline{BP} = \overline{CP} = \overline{DP}$ and so on. Thus, P is equidistant from the polygon's vertices, so P is the center of the polygon and the $\angle$ bisectors are radii.

37. **a.** (2.8, 2.8)

b. 5.6 units^2

c. 45 units^2

38. **a.** $A = \frac{1}{2}bh$ and $h = a \sin C$

b. two sides; included

c. Form n $\triangle$s with the radii. $A(\text{each } \triangle) = \frac{1}{2}r^2 \sin\left(\frac{360}{n}\right)$, so $A = \frac{nr^2}{2} \sin\left(\frac{360}{n}\right)$.