Answers for Lesson 12-3, pp. 681–684 Exercises

1. $\angle ACB$; $\overset{\frown}{AB}$

2. $\angle RQS$; $\overset{\frown}{RS}$

3. $\angle MPN$; $\overset{\frown}{MN}$

4. **a.** $\angle BAD$ and $\overset{\frown}{BCD}$; $\angle ABC$ and $\overset{\frown}{ADC}$; $\angle DCB$ and $\overset{\frown}{DAB}$; $\angle ADC$ and $\overset{\frown}{ABC}$

b. $\angle ABC$ and $\angle BCD$; obtuse

5. 58

6. 180

7. $a = 218$; $b = 109$

8. $a = 54$; $b = 30$; $c = 96$

9. $a = 112$; $b = 120$; $c = 38$

10. $a = 101$; $b = 67$; $c = 84$; $d = 80$

11. $x = 36$; $y = 36$

12. $a = 85$; $b = 47.5$; $c = 90$

13. $a = 50$; $b = 90$; $c = 90$

14. $p = 90$; $q = 122$

15. $w = 123$

16. $x = 65$; $y = 130$

17. $e = 65$; $f = 130$

18. $a = 26$; $b = 64$; $c = 42$

19. $a = 22$; $b = 78$; $c = 156$

20. $a = 30$; $b = 60$; $c = 62$; $d = 124$; $e = 60$

21. **a.** 96

b. 55

c. 77

d. 154

22. **a.** 40

b. 50

c. 40

d. 40

e. 65

23. B

24. **a.** 78

b. 95

c. 105

d. 85

25. $\angle PQR \cong \angle QRS$ since they are alt. int. $\measuredangle$s. Since $\cong$ inscribed $\measuredangle$s intercept $\cong$ arcs, $m\widehat{PR} = m\widehat{QS}$.

26. **a.** Check students' work.

b. isosc. trapezoid; justifications may vary. Sample: arcs between two $\parallel$ chords are $\cong$.

27. **a.** $77\frac{1}{7}$

b. 36

28. Rectangle; opp. $\measuredangle$s are $\cong$ (because figure is $\square$) and suppl. (because opp. $\measuredangle$s intercept arcs whose measures sum to 360). Congruent suppl. $\measuredangle$s are rt $\measuredangle$s, so inscribed $\square$ must be a rectangle.

29. about 7.1 cm by 7.1 cm

30. about 8.7 cm for each side

31. about 7.1 cm legs, and a 10 cm base

32. Answers may vary. Sample:

a. If the cameras' lenses open at $= \measuredangle$s, then in the positions shown they share the same arc of the scene.

b. No; the distances from each position of the scene to each camera affect the look of the scene.

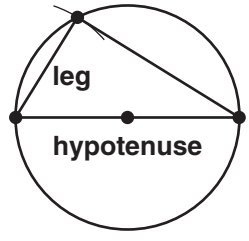
33. $\angle ACB$ is a rt. $\angle$ because it is inscribed in semicircle $\overset{\frown}{ACB}$, and if a line is $\perp$ to a radius at its endpoint, it is tangent to the circle.

34. a. $\angle CEF$, $\angle FEG$, $\angle GED$, $\angle CED$, $\angle CEG$, and $\angle FED$

b. $\angle CED$

c. $\angle EFG$ and $\angle EDG$; $\angle FED$, and $\angle FGD$

35.



36. **1.** $\odot O$ with inscribed $\angle ABC$ (Given)

2. $m\angle ABO = \frac{1}{2}m\overset{\frown}{AP}$; $m\angle OBC = \frac{1}{2}m\overset{\frown}{PC}$ (Inscribed $\angle$ Thm., Case I)

3. $m\angle ABO + m\angle OBC = m\angle ABC$ ($\angle$ Add. Post.)

4. $\frac{1}{2}m\overset{\frown}{AP} + \frac{1}{2}m\overset{\frown}{PC} = m\angle ABC$ (Subst.)

5. $\frac{1}{2}(m\overset{\frown}{AP} + m\overset{\frown}{PC}) = m\angle ABC$ (Distr. Prop.)

6. $\frac{1}{2}m\overset{\frown}{AC} = m\angle ABC$ (Arc Add. Post.)

37. **1.** $\odot S$ with inscribed $\angle PQR$ (Given)

2. $m\angle PQT = \frac{1}{2}m\overset{\frown}{PT}$ (Inscribed $\angle$ Thm., Case I)

3. $m\angle RQT = \frac{1}{2}m\overset{\frown}{RT}$ (Inscr. $\angle$ Thm., Case I)

4. $m\overset{\frown}{PR} = m\overset{\frown}{PT} - m\overset{\frown}{RT}$ (Arc Add. Post.)

5. $m\angle PQR = m\angle PQT - m\angle RQT$ ($\angle$ Add. Post.)

6. $m\angle PQR = \frac{1}{2}m\overset{\frown}{PT} - \frac{1}{2}m\overset{\frown}{RT}$ (Subst.)

7. $m\angle PQR = \frac{1}{2}m\overset{\frown}{PR}$ (Subst.)

38. **1.** $\odot O$, $\angle A$ intercepts $\overset{\frown}{BC}$, and $\angle D$ intercepts $\overset{\frown}{BC}$ (Given)

2. $m\angle A = \frac{1}{2}m\overset{\frown}{BC}$ and $m\angle D = \frac{1}{2}m\overset{\frown}{BC}$ (Inscr. $\angle$ Thm.)

3. $m\angle A = m\angle D$ (Subst.)

4. $\angle A \cong \angle D$ (Def. of $\cong$)

39. **1.** $\odot O$ with inscribed $\angle CAB$ in a semicircle (Given)

2. $m\angle CAB = \frac{1}{2}m\overset{\frown}{BDC}$ (Inscr. $\angle$ Thm.)

3. $m\overset{\frown}{BDC} = 180$ (Meas. of semicircle = 180.)

4. $m\angle CAB = 90$ (Subst.)

5. $\angle CAB$ is a rt. $\angle$. (Def. of rt. $\angle$)

40. **1.** quadrilateral $ABCD$ inscribed in $\odot O$ (Given)

2. $m\angle A = \frac{1}{2}m\overset{\frown}{BCD}$ and $m\angle C = \frac{1}{2}m\overset{\frown}{BAD}$ (Inscr. $\angle$ Thm.)

3. $m\angle A + m\angle C = \frac{1}{2}m\overset{\frown}{BCD} + \frac{1}{2}m\overset{\frown}{BAD}$ (Add. Prop.)

4. $m\overset{\frown}{BCD} + m\overset{\frown}{BAD} = 360$ (Entire circle = 360°.)

5. $m\angle A + m\angle C = 180$ (Subst. & Mult. Prop.)

6. $\angle A$ and $\angle C$ are suppl. (Def. of suppl.)

7. $m\angle B = \frac{1}{2}m\overset{\frown}{ADC}$ and $m\angle D = \frac{1}{2}m\overset{\frown}{ABC}$ (Inscr. $\angle$ Thm.)

8. $m\angle B + m\angle D = \frac{1}{2}m\overset{\frown}{ADC} + \frac{1}{2}m\overset{\frown}{ABC}$ (Add. Prop.)

9. $m\overset{\frown}{ADC} + m\overset{\frown}{ABC} = 360$ (Entire circle = 360.)

10. $m\angle B + m\angle D = 180$ (Subst. and Mult. Prop.)

11. $\angle B$ and $\angle D$ are suppl. (Def. of suppl.)

41. **1.** $\overline{GH}$ and tangent ℓ intersecting at H on $\odot E$ (Given)

2. Construct diameter $\overline{HD}$ intersecting circle E at D. (Constr.)

3. $\angle DHI$ is a rt. $\angle$. (Tangent and radius are $\perp$.)

4. $\overset{\frown}{DGH}$ is a semicircle of measure 180. (Def. of semicircle)

5. $m\angle DHG + m\angle GHI = m\angle DHI$ ($\angle$ Add. Post.)

6. $m\overset{\frown}{DG} + m\overset{\frown}{GFH} = m\overset{\frown}{DGH}$ (Arc Add. Post.)

7. $90 = m\angle DHG + m\angle GHI$ (Subst.)

8. $180 = m\overset{\frown}{DG} + m\overset{\frown}{GFH}$ (Subst.)

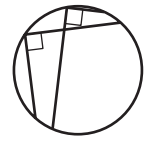
9. $90 = \frac{1}{2}(m\overset{\frown}{DG} + m\overset{\frown}{GFH})$ (Div. Prop.)

10. $m\angle DHG + m\angle GHI = \frac{1}{2}m\overset{\frown}{DG} + \frac{1}{2}m\overset{\frown}{GFH}$ (Subst. and Distr. Prop.)

11. $m\angle DHG = \frac{1}{2}m\overset{\frown}{DG}$ (Inscr. $\angle$ Thm.)

12. $m\angle GHI = \frac{1}{2}m\overset{\frown}{GFH}$ (Subtr. Prop.)

42. false



43. True; the angle's intercepted arc has measure 180, so the angle is inscribed in a semicircle.

44. True; opposite angles in an inscribed quadrilateral intercept non-overlapping arcs totaling 360, and inscribed angles equal half the measure of the arcs they intercept.

45. In the construction below, $RS = x$, $ST = y$, O is the mdpt. of $\overline{RT}$, and $\overline{QS} \perp \overline{RT}$.