Answers for Lesson 5-2, pp. 267–270 Exercises

1. $\overline{AC}$ is the $\perp$ bis. of $\overline{BD}$.

2. 15 **3.** 18 **4.** 8

5. The set of points equidistant from H and S is the $\perp$ bis. of $\overline{HS}$.

6. $x = 12; JK = 17; JM = 17$

7. $y = 3; ST = 15; TU = 15$

8. 27; 27

9. $\overrightarrow{HL}$ is the $\angle$ bis. of $\angle KHF$ because a point on $\overrightarrow{HL}$ is equidistant from $\overrightarrow{HK}$ and $\overrightarrow{HF}$.

10. 9

11. 54; 54

12. 5 **13.** 10 **14.** 10

15. Isosceles; it has 2 $\cong$ sides.

16. equidistant; $RT = RZ$

17. A point is on the $\perp$ bis. of a segment if and only if it is equidistant from the endpts. of the segment.

18. 12 **19.** 4 **20.** 4 **21.** 16

22. 5 **23.** 10 **24.** 7 **25.** 14

26. isosceles; $CS = CT$ and $CT = CY$ by the $\angle$ Bis. Thm.

27. Answers may vary. Sample: The student needs to know that $\overline{QS}$ bisects $\overline{PR}$.

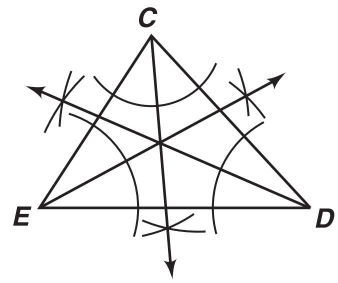
28. No; A is not equidistant from the sides of $\angle X$.

29. Yes; AX bis. $\angle TXR$.

30. Yes; A is equidistant from the sides of $\angle X$.

31. the pitcher's plate

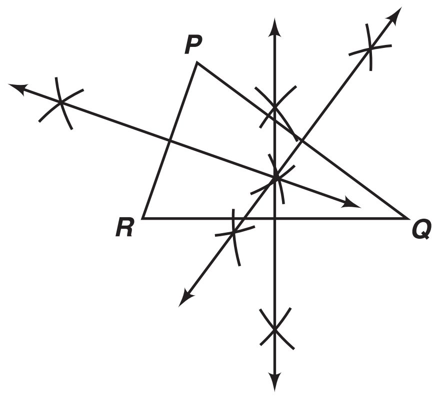
32. **a.**



b. The $\angle$ bisectors intersect at the same point.

c. Check students' work.

33. **a.**



b. The $\perp$ bisectors intersect at the same point.

c. Check students' work.

34–39. Answers may vary. Samples are given.

34. $C(0, 2), D(1, 2); AC = BC = 2, AD = BD = \sqrt{5}$

35. $C(3, 2), D(3, 0); AC = BC = 3, AD = BD = \sqrt{13}$

36. $C(3, 0), D(0, 0); AC = BC = 3, AD = BD = 3\sqrt{2}$

37. $C(0, 0), D(1, 1); AC = BC = 3, AD = BD = \sqrt{5}$

38. $C(2, 2), D(4, 3); AC = BC = \sqrt{5}, AD = BD = \sqrt{10}$

39. $C\left(\frac{5}{2}, \frac{5}{2}\right), D(5, 3); AC = BC = \frac{\sqrt{26}}{2}, AD = BD = \sqrt{13}$

40. $\overline{AC} \cong \overline{BC}$ by definition of bisector. $\overleftrightarrow{CD} \perp \overline{AB}$, so $\angle DCA$ and $\angle DCB$ are right $\angle$s. Therefore, $\angle DCA \cong \angle DCB$ because all rt. $\angle$s are $\cong$. $\overline{DC} \cong \overline{DC}$ by the Reflexive Property of Congruence. Therefore, $\triangle CDA \cong \triangle CDB$ by Side-Angle-Side. $\overline{DA} \cong \overline{DB}$ because CPCTC, so $DA = DB$.

41. $\triangle ABP$ and $\triangle ABQ$ are right triangles with a common leg and congruent hypotenuses. Thus, $\triangle BAP \cong \triangle BAQ$ by the HL Theorem. $\overline{PB} \cong \overline{BQ}$ using CPCTC, so $\overline{AB}$ bisects $\overline{PQ}$ by the definition of bisector. Hence, $\overline{AB}$ is the perpendicular bisector of $\overline{PQ}$.

42. **a.** $\ell : y = -\frac{3}{4}x + \frac{25}{2}; m : x = 10$

b. (10, 5)

c. $CA = CB = 5$

d. C is equidist. from $\overrightarrow{OA}$ and $\overrightarrow{OB}$.

43. $\overline{BP} \perp \overrightarrow{AB}$ and $\overline{PC} \perp \overrightarrow{AC}$, thus $\angle ABP$ and $\angle ACP$ are rt. $\angle$s. Since $\overrightarrow{AP}$ bisects $\angle BAC$, $\angle BAP \cong \angle CAP$. $\overline{AP} \cong \overline{AP}$ by the Reflexive Prop. of $\cong$. Thus $\triangle ABP \cong \triangle ACP$ by AAS and $\overline{PB} \cong \overline{PC}$ by CPCTC. Therefore, $PB = PC$.

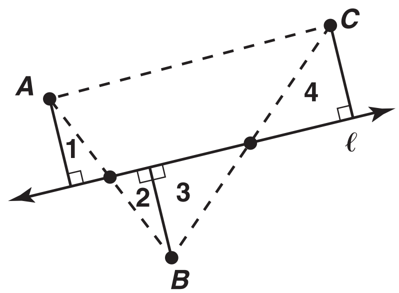
44.

1. $\overline{SP} \perp \overrightarrow{QP}$; $\overline{SR} \perp \overrightarrow{QR}$	**1.** Given
2. $\angle QPS$ and $\angle QRS$ are rt. $\angle$s.	**2.** Def. of $\perp$
3. $\angle QPS \cong \angle QRS$	**3.** All rt. $\angle$s are $\cong$.
4. $SP = SR$	**4.** Given
5. $\overline{QS} \cong \overline{QS}$	**5.** Refl. Prop. of $\cong$
6. $\triangle QPS \cong \triangle QRS$	**6.** HL
7. $\angle PQS \cong \angle RQS$	**7.** CPCTC
8. $\overrightarrow{QS}$ bisects $\angle PQR$.	**8.** Def. of $\angle$ bis

45. D

46. $y = 2$ **47.** $y = -(x - 2)$ **48.** $y = -\frac{1}{2}x + 4$

49. Line ℓ through the midpoints of 2 sides of $\triangle ABC$ is equidistant from A, B, and C. This is because $\triangle 1 \cong \triangle 2$ and $\triangle 3 \cong \triangle 4$ by ASA.



50. a. A point on the $\perp$ bis. of a segment is equidistant from endpoints of the segment ($\perp$ Bis. Thm.), so $MA = MB$ and $MB = MC$.

b. $MA = MB = MC$ by part a. $\angle EMA$, $\angle EMB$, and $\angle EMC$ are rt. $\angle$s by def. of line $\perp$ plane (page 49, Exercise 36). $\overline{MG} \cong \overline{MG}$ by the Refl. Prop. of $\cong$, so $\triangle EAM \cong \triangle EBM \cong \triangle ECM$ by SAS.