2.5 Geometry - Second Edition, Proofs about Angle Pairs and Segments, Review Answers

1.

Table 2.11:

Statement	***Reason***
1. $\overline{AC} \perp \overline{BD}, \angle 1 \cong \angle 4$	Given
2. $m\angle 1 = m\angle 4$	$\cong$ angles have $=$ measures
3. $\angle ACB$ and $\angle ACD$ are right angles	$\perp$ lines create right angles
4. $m\angle ACB = 90°$	
m $\angle ACD = 90°$	Definition of right angles
5. $m\angle 1 + m\angle 2 = m\angle ACB$	
m $\angle 3 + m\angle 4 = m\angle ACD$	Angle Addition Postulate
6. $m\angle 1 + m\angle 2 = 90°$	
m $\angle 3 + m\angle 4 = 90°$	Substitution
7. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$	Substitution

Table 2.11: (continued)

Statement	***Reason***
8. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 1$	Substitution
9. $m\angle 2 = m\angle 3$	Subtraction PoE
10. $\angle 2 \cong \angle 3$	$\cong$ angles have $=$ measures

2.

Table 2.12:

Statement	***Reason***
1. $\angle MLN \cong \angle OLP$	Given
2. $m\angle MLN = m\angle OLP$	$\cong$ angles have $=$ measures
3. $m\angle MLO = m\angle MLN + m\angle NLO$	
m $\angle NLP = m\angle NLO + m\angle OLP$	Angle Addition Postulate
4. $m\angle NLP = m\angle NLO + m\angle MLN$	Substitution
5. $m\angle MLO = m\angle NLP$	Substitution
6. $\angle NLP \cong \angle MLO$	$\cong$ angles have $=$ measures

3.

Table 2.13:

Statement	***Reason***
1. $\overline{AE} \perp \overline{EC}, \overline{BE} \perp \overline{ED}$	Given
2. $\angle BED$ is a right angle $\angle AEC$ is a right angle	$\perp$ lines create right angles
3. $m\angle BED = 90°$ m $\angle AEC = 90°$	Definition of a right angle
4. $m\angle BED = m\angle 2 + m\angle 3$ m $\angle AEC = m\angle 1 + m\angle 3$	Angle Addition Postulate
5. $90° = m\angle 2 + m\angle 3$ $90° = m\angle 1 + m\angle 3$	Substitution
6. $m\angle 2 + m\angle 3 = m\angle 1 + m\angle 3$	Substitution
7. $m\angle 2 = m\angle 1$	Subtraction PoE
8. $\angle 2 \cong \angle 1$	$\cong$ angles have $=$ measures

4.

Table 2.14:

Statement	***Reason***
1. $\angle L$ is supplementary to $\angle M$ $\angle P$ is supplementary to $\angle O$ $\angle L \cong \angle O$	Given
2. $m\angle L = m\angle O$	$\cong$ angles have $=$ measures
3. $m\angle L + m\angle M = 180°$ m $\angle P + m\angle O = 180°$	Definition of supplementary angles
4. $m\angle L + m\angle M = m\angle P + m\angle O$	Substitution
5. $m\angle L + m\angle M = m\angle P + m\angle L$	Substitution
6. $m\angle M = m\angle P$	Subtraction PoE
7. $\angle M \cong \angle P$	$\cong$ angles have $=$ measures

5.

Table 2.15:

Statement	***Reason***
1. $\angle 1 \cong \angle 4$	Given
2. $m\angle 1 = m\angle 4$	$\cong$ angles have $=$ measures
3. $\angle 1$ and $\angle 2$ are a linear pair $\angle 3$ and $\angle 4$ are a linear pair	Given (by looking at the picture) could also be Definition of a Linear Pair
4. $\angle 1$ and $\angle 2$ are supplementary $\angle 3$ and $\angle 4$ are supplementary	Linear Pair Postulate
5. $m\angle 1 + m\angle 2 = 180°$ m $\angle 3 + m\angle 4 = 180°$	Definition of supplementary angles
6. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$	Substitution
7. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 1$	Substitution
8. $m\angle 2 = m\angle 3$	Subtraction PoE
9. $\angle 2 \cong \angle 3$	$\cong$ angles have $=$ measures

6.

Table 2.16:

Statement	***Reason***
1. $\angle C$ and $\angle F$ are right angles	Given
2. $m\angle C = 90°, m\angle F = 90°$	Definition of a right angle
3. $90° + 90° = 180°$	Addition of real numbers
4. $m\angle C + m\angle F = 180°$	Substitution

7.

Table 2.17:

Statement	***Reason***
1. $l \perp m$	Given
2. $\angle 1$ and $\angle 2$ are right angles	$\perp$ lines create right angles.
3. $\angle 1 \cong \angle 2$	Right Angles Theorem

8.

Table 2.18:

Statement	***Reason***
1. $m\angle 1 = 90°$	Given
2. $\angle 1$ and $\angle 2$ are a linear pair	Definition of a linear pair
3. $\angle 1$ and $\angle 2$ are supplementary	Linear Pair Postulate
4. $m\angle 1 + m\angle 2 = 180°$	Definition of supplementary angles
5. $90° + m\angle 2 = 180°$	Substitution
6. $m\angle 2 = 90°$	Subtraction PoE

9.

Table 2.19:

Statement	***Reason***
1. $l \perp m$	Given
2. $\angle 1$ and $\angle 2$ make a right angle	$\perp$ lines create right angles
3. $m\angle 1 + m\angle 2 = 90°$	Definition of a right angle
4. $\angle 1$ and $\angle 2$ are complementary	Definition of complementary angles

10.

Table 2.20:

Statement	***Reason***
1. $l \perp m, \angle 2 \cong \angle 6$	Given
2. $m\angle 2 = m\angle 6$	$\cong$ angles have $=$ measures
3. $\angle 5 \cong \angle 2$	Vertical Angles Theorem
4. $m\angle 5 = m\angle 2$	$\cong$ angles have $=$ measures
5. $m\angle 5 = m\angle 6$	Transitive

11. $\angle AHM, \angle PHE$
12. $\overline{AM} \cong \overline{MG}, \overline{CP} \cong \overline{PE}, \overline{AH} \cong \overline{HE}, \overline{MH} \cong \overline{HP}, \overline{GH} \cong \overline{HC}$
13. $\angle AMH, \angle HMG$ and $\angle CPH, \angle HPE$
14. $\angle AHC$

15. $\angle MAH, \angle HAC$ and $\angle MGH, \angle HE$
16. $\overline{GC}$
17. $\overline{AE}, \overline{GC}$
18. $\angle AHM, \angle MHG$
19. $\angle AGH \cong \angle HE$
20. Given; $\cong$ angles have $=$ measures; $m\angle ACE = m\angle ACH + m\angle ECH$; $m\angle ACE = m\angle ACH + m\angle ACH$; Combine like terms; $\frac{1}{2}m\angle ACE = m\angle ACH$; $\overline{AC}$ is the angle bisector of $\angle ACH$; Definition of an angle bisector
21. 90°
22. 26°
23. 154°
24. 26°
25. 64°
26. 25°
27. 75°
28. 105°
29. 90°
30. 50°
31. 40°
32. 25°
33. 130°
34. 155°
35. 130°