Lesson 4.4

Challenge Practice

1.

Statements	Reasons
1. $LM = JO$, $MN = ON$ $m\angle LNK = m\angle JNK$	**1.** Given
2. $LN = LM + MN$ $JN = JO + ON$	**2.** Segment Addition Postulate
3. $LN = JO + ON$	**3.** Substitution property of equality
4. $LN = JN$	**4.** Substitution property of equality
5. $\overline{LN} \cong \overline{JN}$	**5.** Definition of congruent segments
6. $\overline{NK} \cong \overline{NK}$	**6.** Reflexive property of congruence
7. $\triangle LNK \cong \triangle JNK$	**7.** SAS Congruence Postulate

2.

Statements	Reasons
1. $\overline{DC} \cong \overline{AF}$	**1.** Given
2. $\overline{FD} \perp \overline{DE}$, $\overline{CA} \perp \overline{AB}$	**2.** Given
3. $\angle EDF$ and $\angle BAC$ are right angles.	**3.** Definition of $\perp$ lines
4. $\angle EDF \cong \angle BAC$	**4.** Right Angles Congruence Theorem
5. $DF = DC + CF$ $CA = CF + FA$	**5.** Segment Addition Postulate
6. $DC = AF$	**6.** Definition of congruent segments
7. $DF = FA + CF$	**7.** Substitution property of equality
8. $DF = CA$	**8.** Substitution property of equality
9. $\overline{DF} \cong \overline{CA}$	**9.** Definition of congruent segments
10. $\triangle ABC \cong \triangle DEF$	**10.** SAS Congruence Postulate

3.

Statements	Reasons
1. $DE = BF$, $AE = CF$	**1.** Given
2. $\overline{AE} \perp \overline{DB}$, $\overline{CF} \perp \overline{BD}$	**2.** Given
3. $\angle AEB$ and $\angle CFD$ are right angles.	**3.** Definition of $\perp$ lines
4. $\angle AEB \cong \angle CFD$	**4.** Right Angles Congruence Theorem
5. $BE = BF + FE$ $FD = FE + ED$	**5.** Segment Addition Postulate
6. $FD = FE + BF$	**6.** Substitution property of equality
7. $FD = BE$	**7.** Substitution property of equality
8. $\overline{AE} \cong \overline{CF}$ $\overline{FD} \cong \overline{BE}$	**8.** Definition of congruent segments
9. $\triangle AEB \cong \triangle CFD$	**9.** SAS Congruence Postulate

4.

Statements	Reasons
1. $\overline{QR} \cong \overline{ST}$, $\overline{QU} \cong \overline{SV}$	**1.** Given
2. $\overline{RS} \parallel \overline{QT}$, $\overline{QR} \parallel \overline{TS}$	**2.** Given
3. $\angle RQU \cong \angle UST$	**3.** Alternate Interior Angles Theorem
4. $QU = SV$	**4.** Definition of congruent segments
5. $QV = QU + UV$ $US = UV + VS$	**5.** Segment Addition Postulate
6. $QV = SV + UV$	**6.** Substitution property of equality
7. $QV = US$	**7.** Substitution property of equality
8. $\overline{QV} \cong \overline{US}$	**8.** Definition of congruent segments
9. $\triangle QRV \cong \triangle STU$	**9.** SAS Congruence Postulate

5. You are given that $\overline{PS} \cong \overline{RQ}$. In the diagram, you can see that $\overline{SR} \parallel \overline{PQ}$. Therefore, by the Alternate Interior Angles Theorem, you can conclude that $\angle RSQ \cong \angle PQS$. By the reflexive property of congruence, $\overline{SQ} \cong \overline{SQ}$. You can now conclude that $\triangle PSQ \cong \triangle RQS$ by the SAS Congruence Postulate.

In the diagram, you can see that $\angle STV$ and $\angle QUV$ are right angles. By the definition of a right triangle, you can conclude that $\triangle STV$ and $\triangle QUV$ are right triangles. You are given that $\overline{SV} \cong \overline{QV}$ and $\overline{ST} \cong \overline{QU}$. Therefore, you can conclude that $\triangle STV \cong \triangle QUV$ by the HL Congruence Theorem. Because $\triangle STV \cong \triangle QUV$, you know that $\overline{TV} \cong \overline{VU}$. So, you can conclude that V is the midpoint of $\overline{TU}$ by the definition of the midpoint of a segment.

6. $X(4, 10)$, $Y(15, 3)$