# SEGMENTS PROOFS

Directions: Complete the proofs below by giving the missing statements and reasons.

❶ **Given:** E is the midpoint of $\overline{DF}$
**Prove:** $2DE = DF$
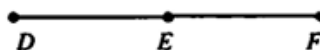
Statements	Reasons
1. E is the midpoint of $\overline{DF}$	1. Given
2. $DE = EF$	2. Def of Midpoint
3. $DE + DE = DE + EF$	3. Addition Property
4. $2DE = DE + EF$	4. Simplify
5. $DE + EF = DF$	5. Segment Addition Postulate
6. $2DE = DF$	6. Transitive Property

❷ **Given:** $\overline{KL} \cong \overline{LN}$, $\overline{LM} \cong \overline{LN}$
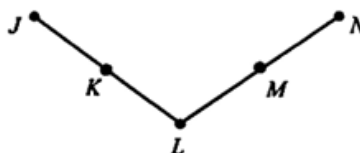**Prove:** L is the midpoint of $\overline{KM}$
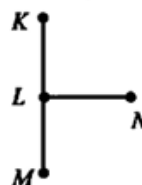
Statements	Reasons
1. $\overline{KL} \cong \overline{LN}$, $\overline{LM} \cong \overline{LN}$	1. Given
2. $KL = LN$, $LM = LN$	2. Def of Congruence
3. $KL = LM$	3. Transitive Property
4. L is the midpoint of $\overline{KM}$	4. Def of Midpoint

❸ **Given:** $\overline{PQ} \cong \overline{TQ}$, $\overline{UQ} \cong \overline{QS}$
**Prove:** $\overline{PS} \cong \overline{TU}$
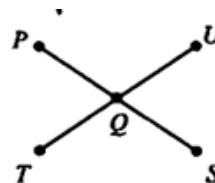
Statements	Reasons
1. $\overline{PQ} \cong \overline{TQ}$, $\overline{UQ} \cong \overline{QS}$	1. Given
2. $PQ = TQ$, $UQ = QS$	2. Def of congruence
3. $PQ + QS = PS$; $TQ + QU = TU$	3. Seg Addition Postulate
4. $TQ + QS = PS$	4. Substitution $(PQ = TQ)$
5. $TQ + QS = TU$	5. Substitution $(QU = QS)$
6. $PS = TU$	6. Transitive Property
7. $\overline{PS} \cong \overline{TU}$	7. Def of Congruence

4 **Given:** K is the midpoint of $\overline{JL}$, M is the midpoint of $\overline{LN}$,
$JK = MN$

Prove: $\overline{KL} \cong \overline{LM}$

Statements	Reasons
1. K is the midpoint of $\overline{JL}$, M is the midpoint of $\overline{LN}$	1. Given
2. $JK = KL$, $LM = MN$	2. Def of Midpoint
3. $JK = MN$	3. Given
4. $MN = KL$, $LM = MN$	4. Substitution (JK = MN)
5. $LM = KL$	5. Transitive Property
6. $KL = LM$	6. Symmetric Property
7. $\overline{KL} \cong \overline{LM}$	7. Def of Congruence

5 **Given:** $\overline{XY} \cong \overline{UV}$, $\overline{YZ} \cong \overline{TU}$

Prove: $\overline{XZ} \cong \overline{TV}$
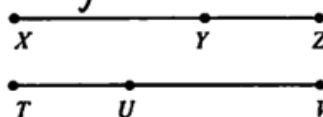
Statements	Reasons
1. $\overline{XY} \cong \overline{UV}$, $\overline{YZ} \cong \overline{TU}$	1. Given
2. $XY = UV$, $YZ = TU$	2. Def of Congruence
3. $XY + YZ = XZ$, $TU + UV = TV$	3. Seg Addition Postulate
4. $UV + YZ = XZ$, $YZ + UV = TV$	4. Substitution (XY = UV, TU = YZ)
5. $XZ = TV$	5. Transitive Property
6. $\overline{XZ} \cong \overline{TV}$	6. Def of Congruence

6 **Given:** $\overline{YW} \cong \overline{YZ}$, $\overline{XY} \cong \overline{VY}$

Prove: $\overline{XZ} \cong \overline{VW}$
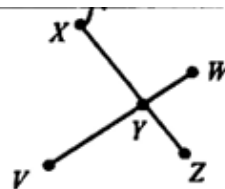
Statements	Reasons
1. $\overline{WY} \cong \overline{YZ}$, $\overline{XY} \cong \overline{VY}$	1. Given
2. $WY = YZ$, $XY = VY$	2. Def of Congruence
3. $XY + YZ = XZ$	3. Seg. Addition Postulate
4. $VY + YW = XZ$	4. Substitution (XY = VY, YZ = YW)
5. $VY + YW = VW$	5. Seg. Addition Postulate
6. $XZ = VW$	6. Transitive Property
7. $\overline{XZ} \cong \overline{VW}$	7. Def of Congruence

1 **Given:** E is the midpoint of $\overline{AC}$, $DE = EC$
**Prove:** $\overline{DE} \cong \overline{AE}$
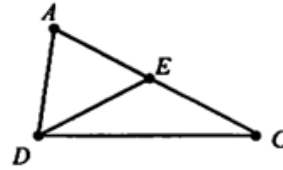
Statements	Reasons
1. E is the midpoint of $\overline{AC}$	1. Given
2. $AE = EC$	2. Definition of Midpoint
3. $DE = EC$	3. Given
4. $AE = DE$	4. Transitive Property
5. $\overline{AE} \cong \overline{DE}$	5. Definition of Congruence
6. $\overline{DE} \cong \overline{AE}$	6. Symmetric Property

8 **Given:** $RS = \dfrac{1}{2}RT$

Prove: S is the midpoint of $\overline{RT}$
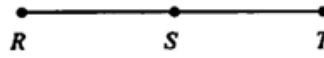
Statements	Reasons
1. $RS = \dfrac{1}{2}RT$	1. Given
2. $2RS = RT$	2. Multiplication Property
3. $RS + ST = RT$	3. Segment Addition Postulate
4. $2RS = RS + ST$	4. Substitution $(RT = RS + ST)$
5. $RS = ST$	5. Subtraction Property
6. S is the midpt of $\overline{RT}$	6. Definition of Midpoint

9 **Given:** M is the midpoint of $\overline{LN}$,
N is the midpoint of $\overline{MO}$

Prove: $\overline{LM} \cong \overline{NO}$
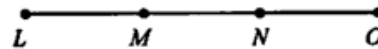
Statements	Reasons
1. M is the midpoint of $\overline{LN}$	1. Given
2. $LM = MN$	2. Definition of Midpoint
3. N is the midpt of $\overline{MO}$	3. Given
4. $MN = NO$	4. Def of Midpoint
5. $LM = NO$	5. Transitive Property of Equality
6. $\overline{LM} \cong \overline{NO}$	6. Definition of Congruence