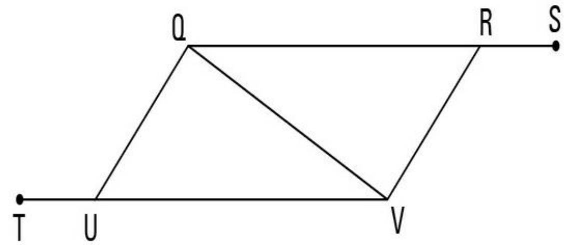
Name: _____**_KEY**____________________ 9.4 Quadrilateral Proofs

1. Given: $\angle UQV \cong \angle RVQ$
$\angle TUQ \cong \angle SRV$

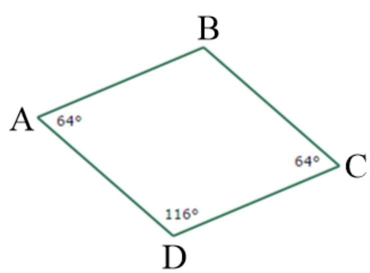
Prove: $QRVU$ is a parallelogram



Statement	Reason
1. $\angle UQV \cong \angle RVQ \quad \angle TUQ \cong \angle SRV$	1. Given
2. $m\angle TUQ + m\angle QUV = 180^\circ$ $m\angle SRV + m\angle QRV = 180^\circ$	2. Definition of a linear Pair
3. $m\angle TUQ + m\angle QUV = m\angle SRV + m\angle QRV$	3. Substitution Property
4. $m\angle TUQ + m\angle QUV = m\angle TUQ + m\angle QRV$	4. Substitution Property
5. $m\angle QUV \cong m\angle QRV$	5. Subtraction Property
6. $\overline{QV} \cong \overline{QV}$	6. Reflexive
7. $\Delta UQV \cong \Delta RVQ$	7. AAS
8. $\overline{UQ} \cong \overline{RV}, \quad \overline{UV} \cong \overline{RQ}$	8. CPCTC
9. $QRVU$ is a parallelogram	9. Both pairs of opposite sides are ≅ then ▱

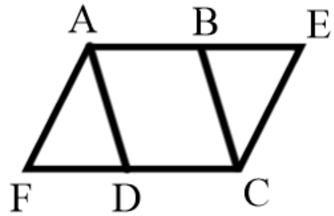
2. Given: $m\angle A = m\angle C = 64^\circ$
$m\angle D = 116^\circ$

Prove: $ABCD$ is a parallelogram



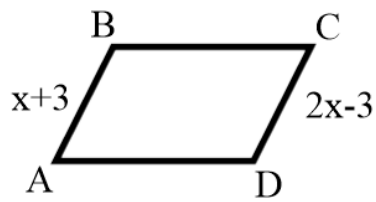
Statement	Reason
1. $m\angle A = m\angle C = 64^\circ$, $m\angle D = 116^\circ$	1. Given
2. $\angle A$ and $\angle D$ are supplementary	2. Definition of Supplementary
3. $\overline{AB} \parallel \overline{DC}$	3. Converse of Same Side Interior Angle Theorem
4. $\angle D$ and $\angle C$ are supplementary	4. Definition of Supplementary
5. $\overline{AD} \parallel \overline{BC}$	5. Converse of Same Side Interior Angle Theorem
6. $ABCD$ is a parallelogram	6. If Opposite sides are || then it's a ▱

3. Given: $\overline{FD} \cong \overline{BE}$
$AECF$ is a parallelogram
Prove: $\overline{AD} \cong \overline{BC}$



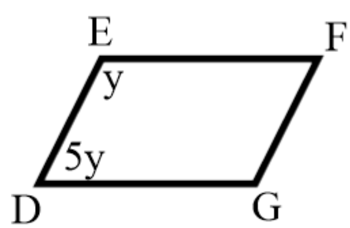
Statement	Reason
1. $\overline{FD} \cong \overline{BE}$, $AECF$ is a parallelogram	1. Given
2. $\angle F \cong \angle E$	2. In ▱ both pairs of opposite $\angle$'s are $\cong$
3. $\overline{AF} \cong \overline{EC}$	3. In ▱ both pairs of opposite sides are $\cong$
4. $\Delta AFD \cong \Delta CEB$	4. SAS
5. $\overline{AD} \cong \overline{BC}$	5. CPCTC

4. Given: $ABCD$ is a parallelogram
Prove: $x = 6$



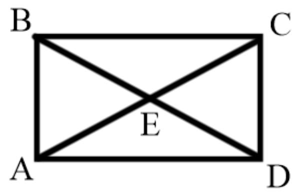
Statement	Reason
1. $ABCD$ is a parallelogram	1. Given
2. $\overline{AB} \cong \overline{DC}$	2. In ▱ both pairs of opposite sides are $\cong$
3. $AB = DC$	3. Congruent Segments have equal length
4. $x + 3 = 2x - 3$	4. Substitution Property
5. $3 = x - 3$	5. Subtraction Property of Equality
6. $6 = x$	6. Addition Property of Equality
7. $x = 6$	7. Symmetric Property of Equality

5. Given: $DEFG$ is a parallelogram
Prove: $m\angle D = 150^\circ$



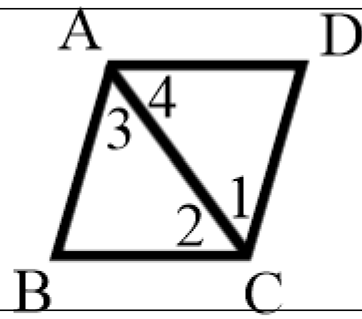
Statement	Reason
1. $DEFG$ is a parallelogram	1. Given
2. $\angle D$ and $\angle E$ are supplementary	2. Same Side Interior Angles are Supplementary
3. $m\angle D + m\angle E = 180^\circ$	3. Definition of Supplementary Angles
4. $5y + y = 180^\circ$	4. Substitution Property
5. $6y = 180^\circ$	5. Substitution Property
6. $y = 30^\circ$	6. Division Property of Equality
7. $m\angle D = 150^\circ$	7. Substitution Property

6. Given: $ABCD$ is a rectangle
$AC = 7y - 19$
$BD = 5y + 1$
Prove: $y = 10$



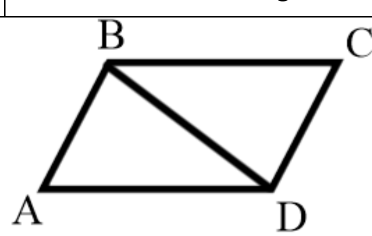
Statement	Reason
1. $ABCD$ is a rectangle	1. Given
2. $\overline{AC} \cong \overline{BD}$	2. Diagonals in a rectangle are congruent
3. $AC = BD$	3. Congruent Segments have Equal Length
4. $AC = 7y - 19$, $BD = 5y + 1$	4. Given
5. $7y - 19 = 5y + 1$	5. Substitution Property of Equality
6. $2y - 19 = 1$	6. Subtraction Property of Equality
7. $2y = 20$	7. Addition Property of Equality
8. $y = 10$	8. Division Property of Equality

7. Given: $ABCD$ is a rhombus
Prove: $\overline{AC}$ bisects $\angle BAD$ and $\angle BCD$



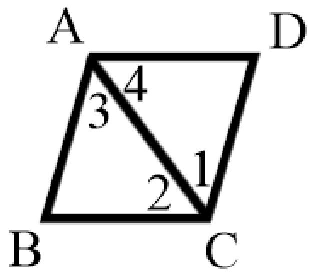
Statement	Reason
1. $ABCD$ is a rhombus	1. Given
2. $\overline{AB} \cong \overline{AD} \cong \overline{CB} \cong \overline{CD}$	2. Definition of a Rhombus
3. $\overline{AC} \cong \overline{AC}$	3. Reflexive Property
4. $\Delta ABC \cong \Delta ADC$	4. SSS
5. $\angle 3 \cong \angle 4$ and $\angle 2 \cong \angle 1$	5. CPCTC
6. $\overline{AC}$ bisects $\angle BAD$ and $\angle BCD$	6. Definition of an angle bisector

8. Given: $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{DA}$
Prove: $ABCD$ is a parallelogram



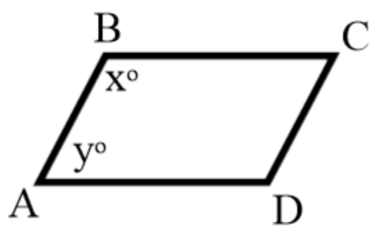
Statement	Reason
1. $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{DA}$	1. Given
2. $\overline{BD} \cong \overline{BD}$	2. Reflexive Property
3. $\Delta ABD \cong \Delta CDB$	3. SSS
4. $\angle ADB \cong \angle CBD$ and $\angle CDB \cong \angle ABD$	4. CPCTC
5. $\overline{AB} \parallel \overline{DC}$ and $\overline{BC} \parallel \overline{AD}$	5. Converse of Corresponding Angles Theorem
6. $ABCD$ is a parallelogram	6. Definition of a Parallelogram

9. Given: $ABCD$ is a parallelogram
$\overline{AC}$ bisects $\angle BAD$ and $\angle BCD$
Prove: $ABCD$ is a rhombus



Statement	Reason
1. $\overline{AC}$ bisects $\angle BAD$ and $\angle BCD$	1. Given
2. $\angle 1 \cong \angle 2$ and $\angle 3 \cong \angle 4$	2. Definition of an angle bisector
3. $\overline{AC} \cong \overline{AC}$	3. Reflexive Property
4. $\Delta ABC \cong \Delta ADC$	4. ASA
5. $\overline{AB} \cong \overline{AD}$ and $\overline{BC} \cong \overline{CD}$	5. CPCTC
6. $ABCD$ is a parallelogram	6. Given
7. $\overline{AB} \cong \overline{CD}$ and $\overline{BC} \cong \overline{AD}$	7. In ▱ both pairs of opposite sides are ≅
8. $\overline{AB} \cong \overline{AD} \cong \overline{BC} \cong \overline{CD}$	8. Transitive Property
9. $ABCD$ is a rhombus	9. Definition of a Rhombus

10. Given: $\angle A \cong \angle C$ and $\angle B \cong \angle D$
Prove: $ABCD$ is a parallelogram



Statement	Reason
1. $\angle A \cong \angle C$ and $\angle B \cong \angle D$	1. Given
2. $m\angle A + m\angle B + m\angle C + m\angle D = 360^\circ$	2. The sum of the measures of the angles of a quadrilateral is 360°
3. $x + y + x + y = 360^\circ$	3. Substitution Property
4. $2x + 2y = 360^\circ$	4. Substitution Property
5. $x + y = 180^\circ$	5. Division Property of Equality
6. $\angle A$ and $\angle B$ are supplementary $\angle A$ and $\angle D$ are supplementary	6. Definition of supplementary angles
7. $\overline{AD} \parallel \overline{BC}$ and $\overline{AB} \parallel \overline{DC}$	7. Converse of Same side Interior Angle Theorem
8. $ABCD$ is a parallelogram	8. Definition of a parallelogram