Name: Key

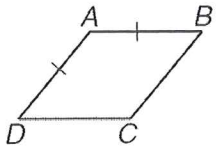
Chapter 6 Quadrilateral Proofs

Write a two-column proof for the following.

#1-5 Parallelogram properties

1. **Given:** ▱$ABCD$; $\overline{AD} \cong \overline{AB}$

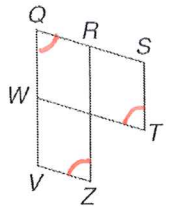
   Prove: $\overline{AD} \cong \overline{AB} \cong \overline{BC} \cong \overline{CD}$



1. parallelogram ABCD $AD \cong AB$	1. given
2. $AB \cong DC$, $AD \cong BC$	2. op. sides of a Parallelogram are $\cong$
3. $BC \cong AD \cong AB \cong DC$	3. Substitution

2. **Given:** ▱$VZRQ$ and ▱$WQST$

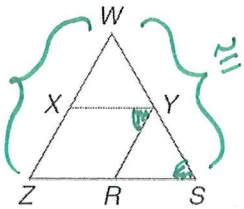
   Prove: $\angle Z \cong \angle T$



1. parallelograms VZRQ and WQST	1. given
2. $\angle Q \cong \angle T$ $\angle Q \cong \angle Z$	2. op. $\angle$s of a Parallelogram are $\cong$
3. $\angle Z \cong \angle T$	3. Substitution

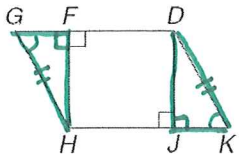
3. **Given:** ▱$XYRZ$, $\overline{WZ} \cong \overline{WS}$

   Prove: $\angle XYR \cong \angle S$



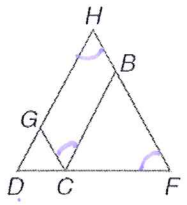
1. parallelogram XYRZ $WZ \cong WS$	1. given
2. $\angle Z \cong \angle S$	2. base $\angle$s of isosc. Δs are $\cong$
3. $\angle Z \cong \angle XYR$	3. op. $\angle$s of a Parallelogram are $\cong$
4. $\angle XYR \cong \angle S$	4. Substitution

4. Given: ▱$DGHK$, $\overline{FH} \perp \overline{GD}$, $\overline{DJ} \perp \overline{HK}$
Prove: $\triangle DJK \cong \triangle HFG$



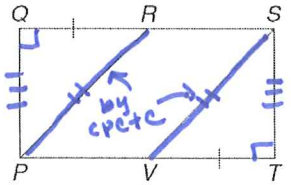
1. para DGHK FH ⊥ GD , DJ ⊥ HK	1. given
2. DK ≅ HG	2. op sides of a Para are ≅
3. ∠HFG = 90°, ∠DJK = 90	3. def of ⊥
4. ∠HFG ≅ ∠DJK	4. substitution
5. ∠K ≅ ∠G	5. op. ∠s of a para are ≅
6. △DJK ≅ △HFG	6. SAA or AAS

5. Given: ▱$BCGH$, $\overline{HD} \cong \overline{FD}$
Prove: $\angle F \cong \angle GCB$



1. para BCGH HD ≅ FD	1. given
2. ∠H ≅ ∠F	2. base ∠s of isosceles △s are ≅
3. ∠H ≅ ∠GCB	3. op. ∠s of a Parallelogram are ≅
4. ∠F ≅ ∠GCB	4. substitution

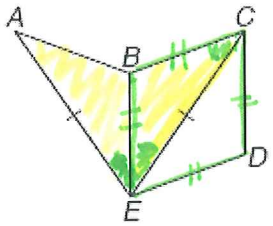
6. Given: $PQST$ is a rectangle.
$\overline{QR} \cong \overline{VT}$
Prove: $\overline{PR} \cong \overline{VS}$



1. PQST is a Rectangle QR ≅ VT	1. given
2. ∠Q = 90; ∠T = 90	2. def of Rectangle
3. ∠Q ≅ ∠T	3. substitution
4. QP ≅ TS	4. op. sides of a Rectangle are ≅
5. △RQP ≅ △VTS	5. SAS
6. PR ≅ VS	6. cpctc

7. **Given:** $BCDE$ is a rhombus, $m\angle AEB = \frac{1}{2} m\angle BCD$ $\overline{AE} \cong \overline{CE}$

Prove: $\triangle ABE \cong \triangle CBE$

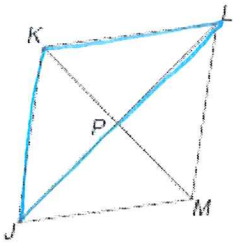


1. BCDE is a Rhombus $\angle AEB = \frac{1}{2}\angle BCD$ $AE \cong CE$	1. given
2. $\angle BCE = \frac{1}{2}\angle BCD$	2. diags bisect the $\angle$s of a Rhombus.
3. $\angle AEB \cong \angle BCE$	3. Substitution
4. $BE \cong BE$	4. Reflexive
5. $BE \cong BC$	5. def of Rhombus 4 $\cong$ sides
6. $\angle BCE \cong \angle BEC$	6. Base $\angle$s of isosc $\triangle$ are $\cong$
7. $\angle AEB \cong \angle BEC$	7. substitution
8. $\triangle ABE \cong \triangle CBE$	8. SAS

- This was a little funky - Put #5-7 after #3 and it flows much better :)

8. **Given:** $JKLM$ is a parallelogram. $\triangle JKL$ is isosceles.

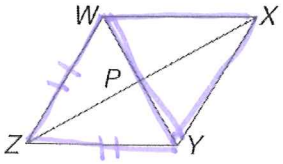
Prove: $JKLM$ is a rhombus.



1. Parallelogram JKLM $\triangle JKL$ is Isosceles	1. given
2. $KL \cong KJ$	2. def of isosceles $\triangle$
3. $KL \cong JM$, $KJ \cong LM$	3. op. sides of a Parallelogram are $\cong$
4. $JM \cong KL \cong KJ \cong LM$	4. substitution
5. JKLM is a Rhombus	5. def of Rhombus (4 $\cong$ sides)

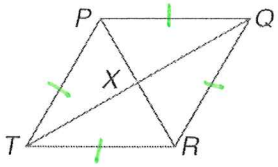
9. **Given:** $\triangle WZY \cong \triangle WXY$, $\triangle WZY$ and $\triangle XYZ$ are isosceles.

Prove: $WXYZ$ is a rhombus.



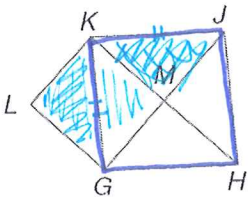
1. $\triangle WZY \cong \triangle WXY$ $\triangle WZY$ and $\triangle XYZ$ are isosceles	1. given
2. $WX \cong XY$, $ZY \cong WZ$	2. def of isosceles
3. $WZ \cong WX$ $ZY \cong XY$	3. cpctc (Because $\cong \triangle$s were given to us)
4. $XY \cong WX \cong WZ \cong ZY$	4. substitution
5. WXYZ is a Rhombus	5. def of Rhombus (4 $\cong$ sides)

10. **Given:** $\triangle TPX \cong \triangle QPX \cong \triangle QRX \cong \triangle TRX$
Prove: $TPQR$ is a rhombus.



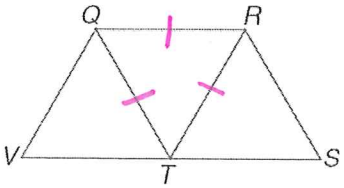
1. $\triangle TPX \cong \triangle QPX \cong \triangle QRX \cong \triangle TRX$	1. given
2. $PQ \cong QR \cong TR \cong TP$	2. CPCTC
3. TPQR is a Rhombus	3. def of Rhombus (4 $\cong$ sides)

11. **Given:** $\triangle LGK \cong \triangle MJK$
$GHJK$ is a parallelogram.
Prove: $GHJK$ is a rhombus.



1. $\triangle LGK \cong \triangle MJK$ GHJK is a parallelogram	1. given
2. $JK \cong GK$	2. CPCTC – bc we already use $\cong \triangle$s.
3. $KJ \cong GH$, $KG \cong JH$	3. op. sides of a Parallelogram are $\cong$
4. $GH \cong JK \cong GK \cong JH$	4. Substitution
5. GHJK is a Rhombus	5. def of Rhombus (4 $\cong$ sides)

12. **Given:** $QRST$ and $QRTV$ are rhombi
Prove: $\triangle QRT$ is equilateral.



1. QRST is a Rhombus QRTV is a Rhombus	1. given
2. $QR \cong QT$, $QR \cong RT$	2. def of Rhombus (all sides are $\cong$)
3. $QT \cong QR \cong RT$	3. substitution
4. $\triangle QRT$ is equilateral	4. def of equilateral (all 3 sides $\cong$)