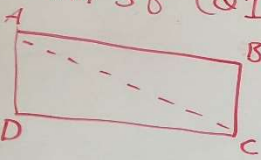


Compiled photographed class quadrilateral proofs:

Q1:

Thm 58 (Q1)



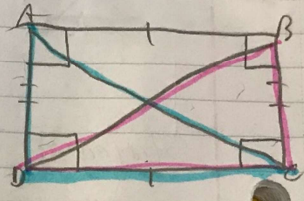
Given quadrilateral ABCD
Either \overline{AC} or \overline{BD} inside ABCD without loss in generality, we may assume \overline{AC} is inside ABCD.
Construct \overline{AC}

By Thm 57 sum of angles in $\triangle ACD$ is 180 (1)
By Thm 57 sum of angles in $\triangle ACB$ is 180 (2)
By Ax 4 $m\angle DAB = m\angle DAC + m\angle BAC$
By Ax 4 $m\angle BCD = m\angle BCA + m\angle DCA$

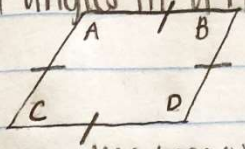
Therefore sum of angles in ABCD is equal to the sum of angles in $\triangle ACB$ + sum of angle in $\triangle ACD$
So sum of angles in ABCD is $180 + 180$ (1,2)
Therefore sum of angles in ABCD is 360

R3

Thm 67/R3 Given Rectangle ABCD
by thm 66(R1) $\overline{AB} \cong \overline{DC}$, $\overline{BC} \cong \overline{AD}$
Construct \overline{AC} and \overline{BD}
Consider $\triangle ADC$, $\triangle BCD$
by S.A.S $\triangle ADC \cong \triangle BCD$
by Thm 31 (CPCTC) $\overline{AC} \cong \overline{BD}$



Theorem 71) H3: "The adjacent angles in a rhombus are supplementary"
 Given rhombus with angle measures as labeled
 then ① $\angle A \cong \angle D$, ② $\angle B \cong \angle C$ (H4)



By Theorem 54(Q1), we know that the measure of all interior angles in a quadrilateral = 360°

$$\text{So } \textcircled{3} \angle A + \angle B + \angle C + \angle D = 360^\circ$$

By substitution (1, 2 into 3) we get $2\angle A + 2\angle B = 360^\circ$ ④

$$2(\angle A + \angle B) = 360^\circ$$

$$\angle A + \angle B = 180^\circ \textcircled{5}$$

By substitution (5 into 3) $180^\circ + \angle C + \angle D = 360^\circ$

$$\angle C + \angle D = 180^\circ \textcircled{6}$$

By substituting (2 into 5) $\angle A + \angle C = 180^\circ$ ⑦

By substituting (7 into 3) $180^\circ + \angle B + \angle D = 360^\circ$

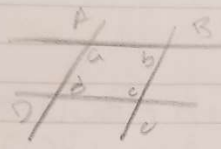
$$\angle B + \angle D = 180^\circ \textcircled{8}$$

Therefore the adjacent angles in a rhombus are supplementary

(8, 7, 6, 5)

P7

P7.



label angles a, b, c, d as shown
 given quad $ABCD$ such that
 $\angle d \cong \angle b$
 $\angle a \cong \angle c$

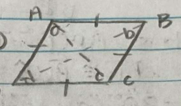
by Q1 $\angle a + \angle b + \angle c + \angle d = 360$
 by sub $2\angle a + 2\angle b = 360$
 $2(\angle a + \angle b) = 360$
 $\angle a + \angle b = 180 \rightarrow$

so by thm 44 $\overline{AD} \parallel \overline{BC}$
 similarly $2\angle a + 2\angle d = 360$
 $2(\angle a + \angle d) = 360$
 $\angle a + \angle d = 180 \rightarrow \leftarrow$

so by thm 44 $\overline{AB} \parallel \overline{DC}$
 so quad $ABCD$ is a parallelogram

H4

H4



Given Rhombus $ABCD$
 and angle measures
 as shown

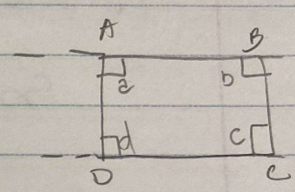
By definition
 $\overline{AB} \cong \overline{BC} \cong \overline{AD} \cong \overline{DC}$
 construct \overline{AC} and \overline{DB}
 consider $\triangle ADC \cong \triangle ABC$
 by thm 20 $\overline{AC} = \overline{AC}$
 by thm 37 (SSS)
 $\triangle ADC \cong \triangle ABC$
 so $d \cong b$

consider $\triangle DAB$ and $\triangle DCB$
 by thm 20 $\overline{DB} = \overline{DB}$
 by thm 37 (SSS)
 $\triangle DAB \cong \triangle DCB$
 so $a \cong c$

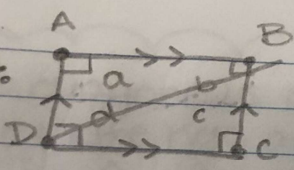
Thus opposite angles in a rhombus are congruent

R2:

R2 Given rectangle ABCD
 With angle measures a, b, c, d labeled as shown
 $a = b = c = d = 90$
 Extend \overline{AB} and \overline{DC} so \overleftrightarrow{AD} is a transversal
 $a + d = 180$
 So by theorem 44
 $\overline{AB} \parallel \overline{DC}$
 Extend \overline{AD} and \overline{BC} so \overleftrightarrow{AB} is a transversal
 $a + b = 180$
 So by theorem 44
 $\overline{AD} \parallel \overline{BC}$

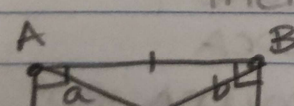


R1

R1: 

Given quad ABCD with angles as labeled
 such that $a = b = c = d = 90^\circ$
 By R2, $\overline{AB} \parallel \overline{DC}$ and $\overline{AD} \parallel \overline{BC}$

Construct \overline{BD}
 Consider \overline{BD} to be \overleftrightarrow{BD} , a transversal
 By Ax. 7, thm. 54, $\angle ADB \cong \angle CBD$ and
 $\angle ABD \cong \angle CDB$
 By thm. 20, $\overline{BD} = \overline{BD}$
 Consider $\triangle ABD$ and $\triangle CDB$
 By thm. 20, $\overline{BD} = \overline{BD}$
 By ASA, $\angle ADB \cong \angle CBD$, $\overline{BD} = \overline{BD}$, $\angle ABD \cong \angle CDB$, so $\triangle ABD \cong \triangle CDB$
 Therefore, $\overline{AD} \cong \overline{BC}$ and $\overline{AB} \cong \overline{DC}$

R3: 

Given quad ABCD with angles

R6 Proof



Given quad ABCD st

$$\overline{AB} \cong \overline{DC} \text{ and}$$

$$\overline{AD} \cong \overline{BC} \text{ and}$$

$$m\angle ADC = 90^\circ$$

Construct \overline{AC}

Consider $\triangle ADC$ and $\triangle CBA$

by Thm 20 $\overline{AC} \cong \overline{AC}$

by SSS $\triangle ADC \cong \triangle CBA$

by CPCTC $\angle ADC \cong \angle CBA$ (1)

$$\angle DAC \cong \angle BCA$$
 (2)

$$\angle DCA \cong \angle BAC$$
 (3)

by Ax 4 $m\angle BAD = m\angle BAC + m\angle DAC$

$$\text{and } m\angle BCD = m\angle BCA + m\angle DCA$$

by Thm 57 $m\angle DAC + m\angle ADC + m\angle DCA = 180^\circ$

$$\text{and } m\angle BCA + m\angle CBA + m\angle BAC = 180^\circ$$

by subs $m\angle DAC + m\angle DCA + 90^\circ = 180^\circ$

$$\text{and } m\angle BCA + m\angle BAC + 90^\circ = 180^\circ$$

by Algebra $m\angle DAC + m\angle DCA = 90^\circ$ (4)

$$\text{and } m\angle BCA + m\angle BAC = 90^\circ$$
 (5)

by subs (3 into 4) $m\angle DAC + m\angle BAC = 90^\circ$

by subs (3 into 5) $m\angle BCA + m\angle DCA = 90^\circ$

Thus all angles = 90°

Therefore quad ABCD is a rectangle