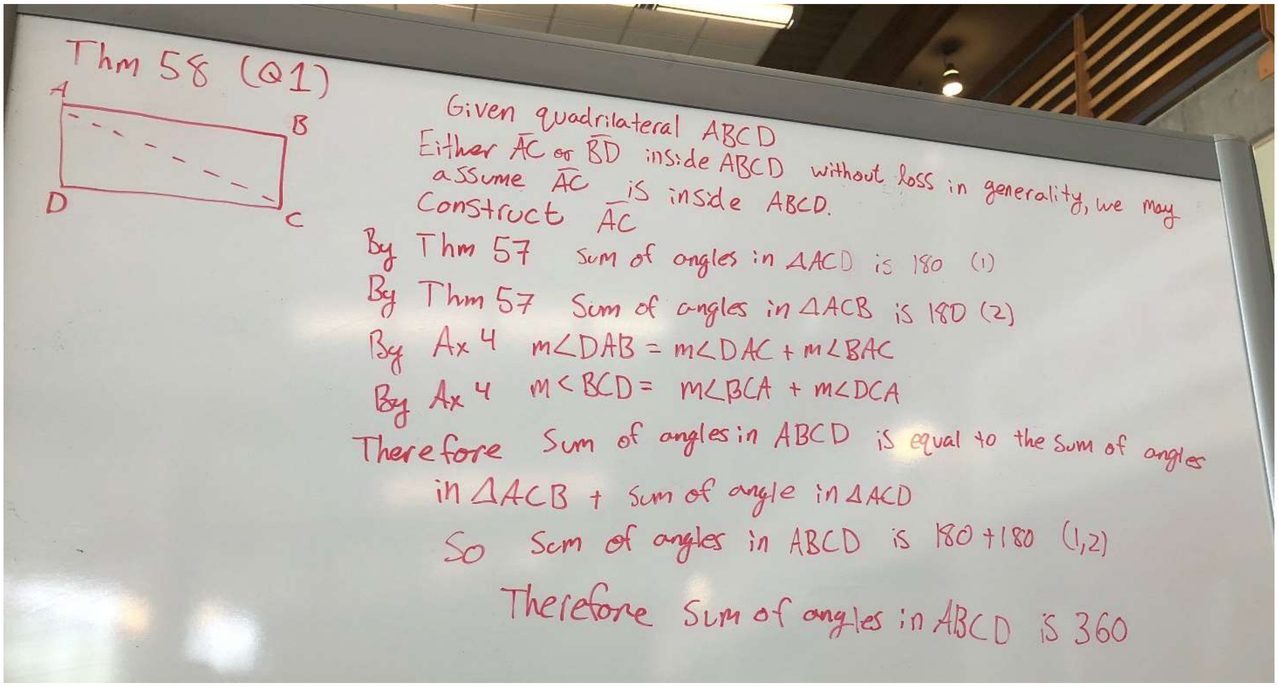
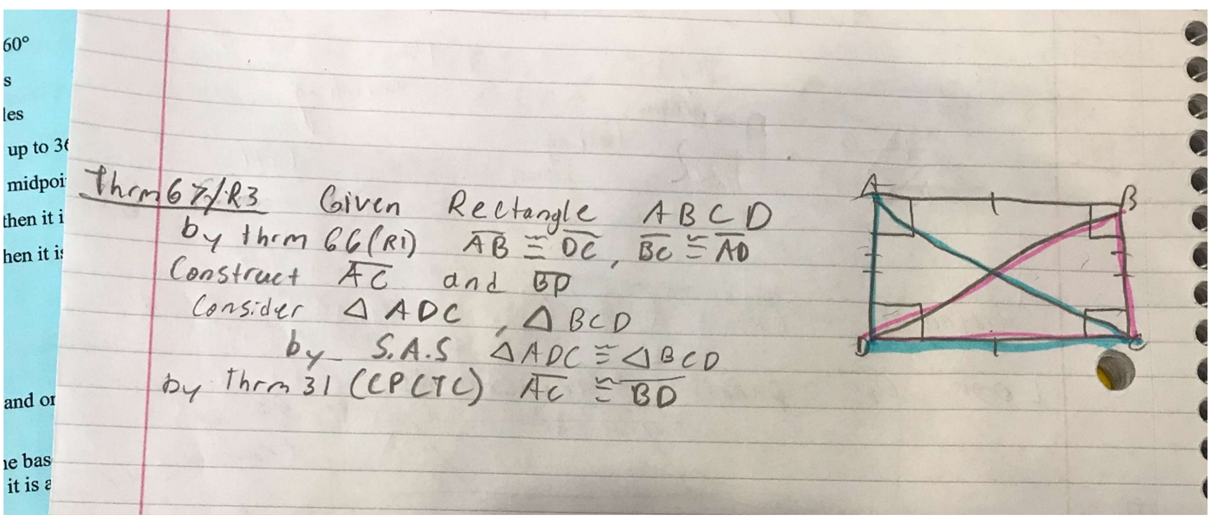
Compiled photographed class quadrilateral proofs:

Q1:



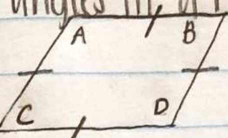
R3



H3:

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 $= 360°$

So ③ $\angle A + \angle B + \angle C + \angle D = 360°$

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

$2(\angle A + \angle B) = 360°$

$\angle A + \angle B = 180°$ ⑤

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

$\angle C + \angle D = 180°$ ⑥

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

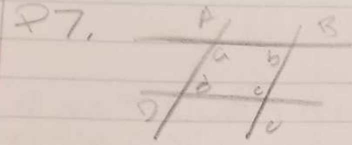
By substituting (7 into 3) $180° + \angle B + \angle D = 360°$

$\angle B + \angle D = 180°$ ⑧

Therefore the adjacent angles in a rhombus are supplementary (8, 7, 6, 5)

P7

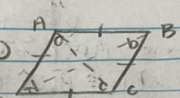
P7.



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 $2\angle a + 2\angle b = 360$
$2(\angle a + \angle b) = 360$
$\angle a + \angle b = 180$
so by thm 44 $\overleftrightarrow{AB} \parallel \overleftrightarrow{BC}$
similarly $2\angle a + 2\angle d = 360$
$2(\angle a + \angle d) = 360$
$\angle a + \angle d = 180$
so by thm 44 $\overleftrightarrow{AB} \parallel \overleftrightarrow{DC}$
so quad ABCD is a parallelogram

H4

H4
Given Rhombus ABCD and angle measures as shown

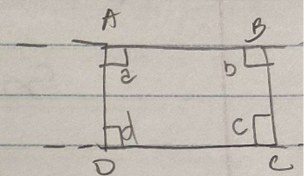


By definition
$\overline{AB} \cong \overline{BC} \cong \overline{AD} \cong \overline{DC}$
construct $\overline{AC}$ and $\overline{DB}$
consider $\triangle ADC$ & ABC
by thm 20 $\overline{AC} = \overline{AC}$
by thm 37 (SSS)
$\triangle ADC \cong \triangle ABC$
so $d \cong b$
consider $\triangle DAB$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

$a + d = 180$

So by theorem 44

$\overline{AB} \parallel \overline{DC}$

Extend $\overleftrightarrow{AD}$ and $\overleftrightarrow{BC}$ so $\overleftrightarrow{AB}$ is a transversal

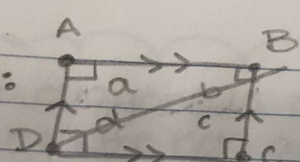
$a + b = 180$

So by theorem 44

$\overline{AD} \parallel \overline{BC}$

R1

<u>R1</u>:



Given quad ABCD with angles as labelled such that $a \neq b = c = d = 90°$

By R2, $\overline{AB} \parallel \overline{CD}$ 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 $\angle ABD \cong \angle CDB$

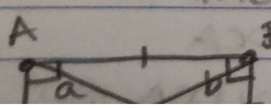
By thm. 20, $\overline{BD} = \overline{BD}$

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

R6 Proof

Given quad ABCD st

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

$\overline{AD} \cong \overline{BC}$ 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 $m\angle BAD = m\angle BAC + m\angle DAC$

and $m\angle BCD = m\angle BCA + m\angle DCA$

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

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

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

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

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

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 $= 90^\circ$

Therefore quad ABCD is a rectangle