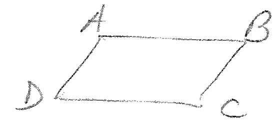
Review Packet #1

Geometry (H)

Name: KEY

Review of 5.1 - 5.5

1. Find the value of x and y that makes ABCD a parallelogram.



AB = 6x + 30, BC = 2x – 5, CD = 2y – 10, AD = y – 35

AB = DC

$\boxed{6x+30=2y-10}$

$6x-2y=-40$

$2(-2x+y=30)$

$-4x+2y=60$

$6x-2y=-40$

$2x=20 \rightarrow x=10$

AD = BC

$\boxed{y-35=2x-5}$

$y=20-5+35$

$y=50$

ck

AB = 90

DC = 90

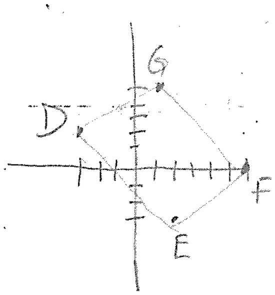
$AB \cong DC$

AD = 15

BC = 15

$AD \cong BC$

2. Determine whether quadrilateral DEFG with vertices D(-3,2), E(2,-3), F(6,0) and G(1,5) is a parallelogram



$m_{\overline{DG}}=\frac{2-5}{-3-1}=\frac{-3}{-4}=\frac{3}{4}$

$m_{\overline{EF}}=\frac{-3-0}{2-6}=\frac{-3}{-4}=\frac{3}{4}$

$\overline{DG} \parallel \overline{EF}$

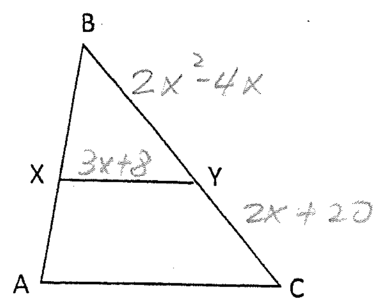
$m_{\overline{DE}}=\frac{2+3}{-3-2}=\frac{5}{-5}=-1$

$m_{\overline{GF}}=\frac{0-5}{6-1}=\frac{-5}{5}=-1$

$\overline{DE} \parallel \overline{GF}$

Yes, DEFG is a ▱.

3. $\overline{XY}$ is the midsegment of △ABC.
BY = $2x^2 - 4x$; YC = 2x + 20; XY = 3x + 8



Find AC.

$2x^2-4x=2x+20$

$2x^2-6x-20=0$

$x^2-3x-10=0$

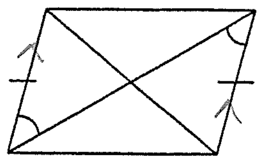
$(x-5)(x+2)=0$

$x=5$	$x=-2$
BY = 30	BY = 16 (8+8)
YC = 30	YC = 16
XY = 23	XY = 2
AC = 46	AC = 4

AC = 46 or 4

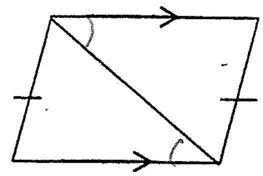
4. Determine whether the following quadrilaterals are parallelograms. Justify your answers. Include a definitions and/or theorem as part of your explanation.

a.



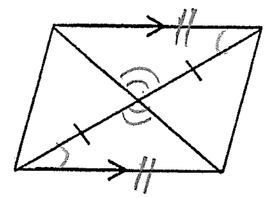
Yes, a $\boxed{p}$.
One pair of opp. sides are both parallel and $\cong$.

b.



Not enough information.

c.



Yes, a $\boxed{p}$
One pair of opp. sides are both $\parallel$ & $\cong$.

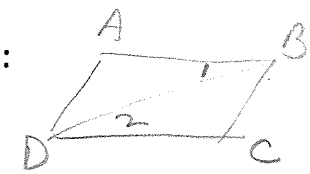
5. Prove the following theorem. Provide a given, prove, diagram and flow proof.

If a quadrilateral is a parallelogram, then the opposite sides are congruent.

Given: $\boxed{p}$ ABCD

Prove: $\overline{AB} \cong \overline{DC}$, $\overline{AD} \cong \overline{BC}$

Diagram:



① Draw $\overline{BD}$.
② $\boxed{p}$ ABCD → ③ $\overline{AB} \parallel \overline{DC}$ → ④ $\angle 1 \cong \angle 2$
⑤ $\overline{BD} \cong \overline{BD}$
② → ⑥ $\angle A \cong \angle C$
④, ⑤, ⑥ → ⑦ $\triangle ABD \cong \triangle CDB$ → ⑧ $\overline{AB} \cong \overline{DC}$, $\overline{AD} \cong \overline{BC}$

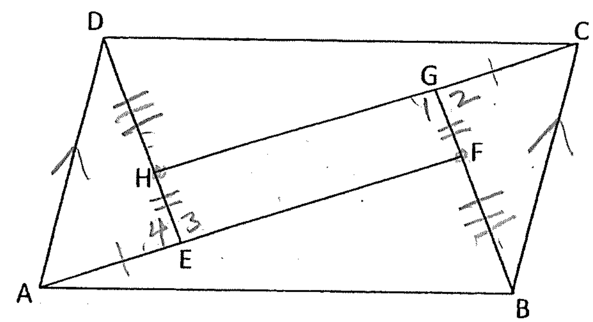
① 2 points determine a line.
② Given
③ In a $\boxed{p}$ → opp sides $\parallel$.
④ 2 $\parallel$ lines → alt. int. $\angle$s $\cong$.
⑤ Reflexive property
⑥ In a $\boxed{p}$ → opp $\angle$s $\cong$.
⑦ AAS $\cong$ AAS
⑧ CPCTC

6. Write a flow proof for the following.

Given: EFGH is a parallelogram
$\overline{HD} \cong \overline{FB}$; $\overline{AE} \cong \overline{CG}$; $\overline{DA} \parallel \overline{BC}$

Prove: ABCD is a parallelogram

Plan: show 1 pair sides parallel & ≅.



(1) ▱ EFGH → (2) ∡1 ≅ ∡3

(3) ∡3 & ∡4 linear pair → (4) ∡3 supp ∡4
∡1 & ∡2 linear pair → ∡1 supp ∡2

(2), (4) → (5) ∡2 ≅ ∡4

→ (6) $\overline{HE} \cong \overline{GF}$ → (6a) HE = GF
(7) $\overline{HD} \cong \overline{FB}$ → (7a) HD = FB

→ (8) HE + HD = GF + FB

(9) DE = HD + HE
BG = FB + GF

→ (10) $\overline{DE} \cong \overline{BG}$

(11) $\overline{AE} \cong \overline{CG}$

→ (12) △AED ≅ △CGB

→ (13) $\overline{AD} \cong \overline{BC}$
(14) $\overline{DA} \parallel \overline{BC}$

→ (15) ABCD is a ▱.

(1) Given
(2) In a ▱, opp ∡s ≅.
(3) Def. of linear pair.
(4) If a linear pair, ∡s supp.
(5) Congruent supplements Thm.
(6) ▱ → opp sides ≅.
(6a) ≅ sides have equal measures.
(7) ▱ → opp sides ≅.
(7a) ≅ sides have equal measure,
(8) Addition Prop.
(9) Segmt Add. Postulate
(10) Substitution Prop.
(11) Given
(12) SAS ≅ Post.
(13) CPCTC
(14) Given
(15) In a quad, if one pair sides ≅ & parallel → ▱.

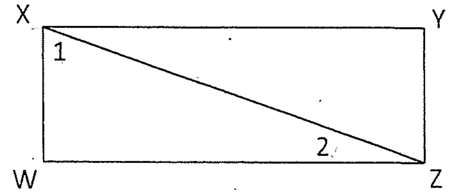
Geometry (H)
Chapter 5 – Proof practice

Name: KEY

Write a flow proof for each of the following.

1. Given: ▱ WXYZ; $\angle 1$ complementary $\angle 2$

   Prove: WXYZ is a rectangle



① ∡1 comp. ∡2 → ② m∡1 + m∡2 = 90
③ m∡1 + m∡2 + m∡W = 180 → ④ 90 + m∡W = 180

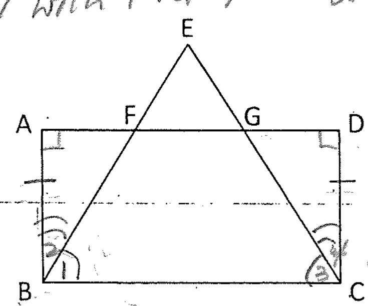
→ ⑤ m∡W = 90 → ⑥ ∡W is Rt.
⑦ ▱ WXYZ → ⑧ WXYZ is a rect.

Corollary: The acute ∡s of a Rt. Δ are compl. → Rt. Δ must be given.

① Given
② Def. compl. ∡s.
③ Sum of ∡s of Δ = 180
④ Substitution
⑤ Subtraction
⑥ Def. Rt. ∡
⑦ Given
⑧ ▱ with 1 Rt ∡ → a rectangle.

2. Given: Rect ABCD; $\overline{BE} \cong \overline{CE}$

   Prove: $\overline{AF} \cong \overline{DG}$ (Show ΔABF ≅ ΔDCG by ASA)



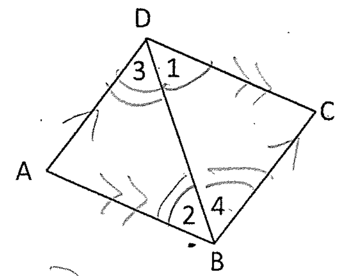
✳ complement Thm can replace these

① $\overline{BE} \cong \overline{CE}$ → ② ∡1 ≅ ∡3
③ Rect. ABCD → ④ ∡A, ∡D, ∡ABC, ∡BCD are Rt. ∡s → ⑤ m∡ABC = m∡BCD
⑥ m∡ABC = m∡1 + m∡2, m∡BCD = m∡3 + m∡4 → ⑦ m∡1 + m∡2 = m∡3 + m∡4

⑧ ∡2 ≅ ∡4
⑨ $\overline{AB} \cong \overline{CD}$
⑩ ∡A ≅ ∡D
→ ⑪ ΔABF ≅ ΔDCG → ⑫ $\overline{AF} \cong \overline{DG}$

① Given
② 2 sides of Δ ≅ → opp ∡s ≅.
③ Given
④ Rect has 4 Rt ∡s.
⑤ All Rt. ∡s ≅.
⑥ Angle Add. Post.
⑦ Substitution
⑧ Subtraction
⑨ Rect → opp sides ≅.
⑩ All Rt. ∡s ≅.
⑪ ASA ≅ ASA
⑫ CPCTC

3. Given: $\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 4$, $\angle 2 \cong \angle 3$

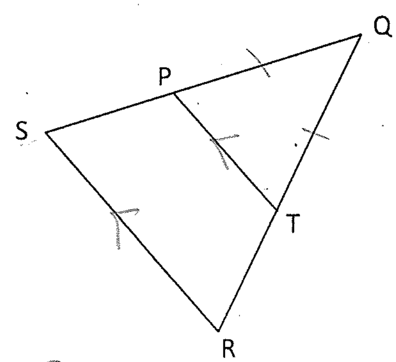


Prove: ABCD is a rhombus

① $\angle 1 \cong \angle 2$ → ② $\overline{DC} \parallel \overline{AB}$
③ $\angle 3 \cong \angle 4$ → ④ $\overline{AD} \parallel \overline{BC}$
→ ⑤ ABCD is ▱
⑥ $\angle 2 \cong \angle 3$ → ⑦ $\overline{AD} \cong \overline{AB}$
→ ⑧ ABCD is a rhombus.

① Given
② Alt. int. $\angle$s $\cong$ → 2 $\parallel$ lines.
③ Given
④ Same as # 2
⑤ Opp sides $\parallel$ → ▱
⑥ Given
⑦ 2 $\angle$s $\cong$ → sides opp $\cong$.
⑧ ▱ with one pr. consecutive sides $\cong$ → rhombus.

4. Given: $\triangle SQR$ isosceles w/ vertex $\angle Q$
$\triangle PQT$ isosceles w/ vertex $\angle Q$
$\overline{TP} \,//\, \overline{RS}$



Prove: RSPT is an isosceles trapezoid

① Isos. $\triangle SQR$ → ② $SQ = RQ$
③ $SQ = SP + PQ$
$RQ = RT + TQ$
→ ④ $SP + PQ = RT + TQ$
⑤ Isos. $\triangle PQT$ → ⑥ $PQ = QT$
→ ⑦ $\overline{SP} \cong \overline{TR}$
⑧ $\overline{TP} \parallel \overline{RS}$
→ ⑨ TRAP RSPT
⑩ $\overline{SP} \cong \overline{TR}$
→ ⑪ Isos. trap RSPT

① Given
② Isos $\triangle$ → opp sides $\cong$.
③ Seg. Add. Post.
④ Substitution
⑤ Given
⑥ Isos $\triangle$ → opp sides $\cong$.
⑦ Subtraction
⑧ Given
⑨ Def of trapezoid
⑩ refer to #7.
⑪ Def isos. trap.