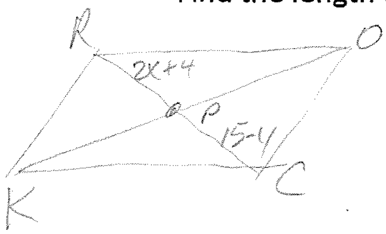
Geometry (H)
Section 5.1 & 5.2 – More problems

Name: KEY

1. ROCK is a parallelogram with diagonals $\overline{OK}$ and $\overline{RC}$ intersection at P.
RP = 2x + 4, OP = 6 + 3y, CP = 15 – y, KP = x + 4
Find the length of the diagonals $\overline{OK}$ and $\overline{RC}$.



$\boxed{2x+4=15-y \qquad x+4=6+3y}$

$-3y+x=2$

$3(2x+y=11)$
$x-3y=2$

$6x+3y=33$
$x-3y=2$

$7x=35$
$x=5$

$10+4=15-y$
$y=1$

$\left.\begin{array}{l} OP=9 \\ PK=9 \end{array}\right\}$ $\boxed{OK=18}$

$\left.\begin{array}{l} RP=14 \\ PC=14 \end{array}\right\}$ $\boxed{RC=28}$

* 2. Determine whether WAVE is a parallelogram. use distance AND/or slope
W(2,5), A(3,3), V(-2,-3), E(-3,-1)

$d_{\overline{EW}} = \sqrt{(2+3)^2+(5+1)^2}$
$\sqrt{25+36}$
$d_{\overline{EW}} = \sqrt{61}$

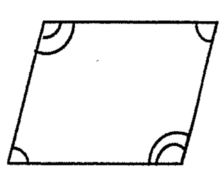
$d_{\overline{VA}} = \sqrt{(3+2)^2+(3+3)^2}$
$\sqrt{25+36}$
$\sqrt{61}$

$M_{\overline{EW}} = \frac{5+1}{2+3} = \frac{6}{5}$

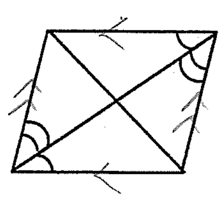
$M_{\overline{VA}} = \frac{3+3}{3+2} = \frac{6}{5}$

Since 1 pr. of opp sides are ≅ and parallel, yes, WAVE is a ▱.

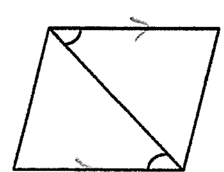
3. Determine if the following quadrilaterals are parallelogram. Justify your answer with a definition or theorem.

a. 

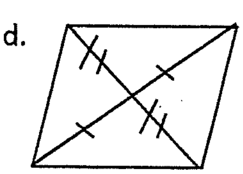
Yes, opp ∠s ≅.

b. 

Yes, opp sides ∥.

c. 

Not enough info.

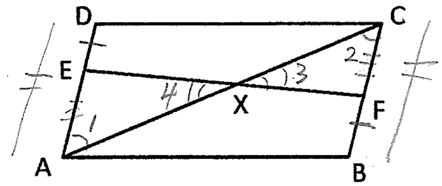
d. 

Yes, diagonals bisect each other

4. Write a flow proof for each of the following.

a. Given: ▱ABCD; $\overline{DE} \cong \overline{FB}$

Prove: $\overline{AC}$ bisects $\overline{EF}$



(I) Show $\overline{EA} \cong \overline{CF}$

(II) Show $\triangle EAX \cong \triangle CFX$

(III) Show $\overline{EX} \cong \overline{XF}$

(1) ▱ABCD → (2) $\overline{DA} \cong \overline{CB}$

(3) $DA = DE + EA$

→ (4) $\overline{DE} + \overline{EA} \cong \overline{CB}$

(5) $\overline{BC} \cong \overline{BF} + \overline{FC}$

→ (6) $\overline{DE} + \overline{EA} \cong \overline{BF} + \overline{FC}$

(6a) $\overline{DE} \cong \overline{FB}$

→ (7) $\overline{EA} \cong \overline{FC}$

(1) → (8) $\overline{DA} \parallel \overline{CB}$ → (9) $\angle 1 \cong \angle 2$

(10) $\angle 3 \cong \angle 4$

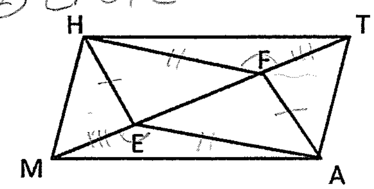
→ (11) $\triangle EAX \cong \triangle FCX$

→ (12) $\overline{EX} \cong \overline{XF}$ → (13) $\overline{AC}$ bisects $\overline{EF}$

(1) Given
(2) ▱ → opp sides ≅.
(3) Segment Addition Postulate
(4) Substitution
(5) Segment Add. Post.
(6) Substitution
(6a) Given
(7) Subtraction Post.
(8) ▱ → opp sides ∥
(9) 2 ∥ lines → alt. int ∡s ≅
(10) Vertical ∡s ≅
(11) AAS ≅ AAS
(12) CPCTC
(13) Def. of seg. bisector

b. Given: ▱ HFAE; $\overline{FM} \cong \overline{ET}$

Prove: MATH is a ▱



(1) ▱ HFAE → (2) $\overline{HF} \cong \overline{EA}$

→ (3) $\overline{HF} \parallel \overline{EA}$ → (4) $\angle HFT \cong \angle MEA$

(5) $\overline{FM} \cong \overline{ET}$ → (6) $\overline{ME} \cong \overline{FT}$

→ (7) $\triangle MEA \cong \triangle TFH$

→ (8) $\angle HTF \cong \angle AME$ → (9) $\overline{HT} \parallel \overline{MA}$

→ (10) $\overline{HT} \cong \overline{MA}$

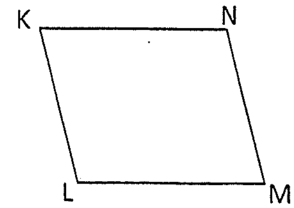
→ (11) MATH is ▱

(1) Given
(2) ▱ → opp sides ≅
(3) ▱ → opp sides ∥.
(4) 2 ∥ lines → alt. ext. ∡s ≅.
(5) Given
(6) Common Segment Thm
(7) SAS ≅ SAS
(8) CPCTC
(9) 2 lines & alt. int ∡s ≅ → 2 ∥ lines
(10) CPCTC
(11) Quad with 1 pr. sides ≅ & ∥ → ▱.

Geometry (H) Name: Key

Section 5.1 – more problems

1. Complete each statement about ▱KLMN.



a. If KN = 3x – 5, LM = x + 9, KN = 16

$3x-5=x+9$

$2x=14$

$x=7$

$KN=21-5$

b. If KL = $\frac{x}{2}$, MN = 2x – 9, then KL = 3

$\frac{x}{2}=2x-9$

$x=4x-18$

$18=3x$

$6=x$

$KL=\frac{6}{2}$

c. If KL = 8, MN = $\frac{x^2}{2}$, x = 4 or -4

$8=\frac{x^2}{2}$

$x^2=16$

$x=4$ or -4

d. If m∠K = 4x + 11, m∠L = 6x – 1, m∠K = 79°

$4x+11+6x-1=180$

$10x=170$

$x=17$

$=4(17)+11$

$=68+11$

e. If m∠K = 31, m∠M = $2x^2$ – 1, m∠N = 149°

$2x^2-1=31$

$2x^2=32$

$x^2=16$

$x=\pm 4$

$180-31=149$

f. If m∠L = x – 40, m∠N = $\frac{3x}{4}$, m∠L = 120°

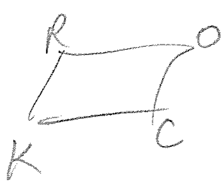
$=160-40$

$x-40=\frac{3x}{4}$

$4x-160=3x$

$x=160$

2. ROCK is a parallelogram. m∠R = x + 3y, m∠O = x – 4, m∠C = 4y – 8. Find m∠K.



$$\boxed{\begin{array}{l} x+3y=4y-8 \\ x+3y+x-4=180 \end{array}} \rightarrow x=y-8$$

$x=32$

$2x+3y=184$

$2(y-8)+3y=184$

$2y-16+3y=184$

$5y=200$

$y=40$

$m\angle C=4y-8$

$4(40)-8$

$=160-8$

$=152$

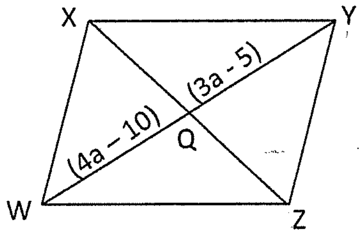
$m\angle K=180-152=28°$

ck

$m\angle R=x+3y$

$32+120=152°$ ✓

3. XYZW is a parallelogram. XZ + YW = 52
Find QZ.



$4a-10=3a-5$

$a=5$

$WQ=10$, $YQ=10$ $\rangle$ $WY=20$

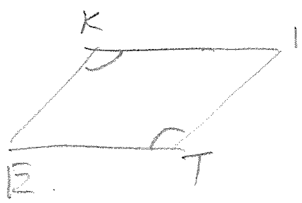
$XZ+20=52$

$XZ=32$

$\frac{1}{2}XZ=16$

$QZ=16$

4. KITE is a parallelogram. m∠K = $x^2 + 10x$ and m∠T = 3x + 60. Find m∠E.



$x^2+10x=3x+60$

$x^2+7x-60=0$

$(x+12)(x-5)=0$

$x=-12$	$x=5$
$m\angle T=-36+60$	$m\angle T=15+60$
$=24$	$=75$
ck: $m\angle K=144-120$	$m\angle K=25+50$
$=24$ ✓	$=75$ ✓

m∠E:

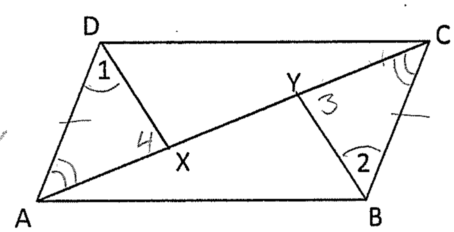
$180-24=156$ or $180-75=105$

5. Write a flow proof.

Given: ▱ABCD; ∠1 ≅ ∠2

Prove: $\overline{DX} \parallel \overline{BY}$

Show △ADX ≅ △CBY (ASA)



① ▱ ABCD → ② $\overline{DA} \parallel \overline{CB}$ → ③ ∠DAX ≅ ∠CBY

→ ④ $\overline{DA} \cong \overline{CB}$

⑤ ∠1 ≅ ∠2

→ ⑥ △ADX ≅ △CBY

→ ⑦ ∠3 ≅ ∠4 → ⑧ $\overline{DX} \parallel \overline{BY}$

① Given

② ▱ → opp sides ∥

③ If 2 ∥ lines → alt. int. ∠s ≅

④ ▱ → opp sides ≅

⑤ Given

⑥ ASA ≅ ASA

⑦ CPCTC

⑧ If 2 lines → alt. ext. ∠s ≅ → 2 ∥ lines