

Geometry (H)

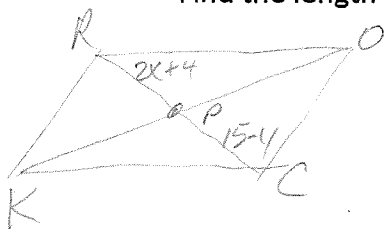
Section 5.1 & 5.2 – More problems

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} .



$$\begin{cases} 2x+4 = 15-y & x+4 = 6+3y \end{cases}$$

$$\begin{cases} OP = 9 \\ PK = 9 \end{cases} \Rightarrow \boxed{OK = 18}$$

$$\begin{aligned} 3(2x+4) &= 11 & -3y+x &= 2 \end{aligned}$$

$$x - 3y = 2$$

$$10 + 4 = 15 - y$$

$$\begin{cases} RP = 14 \\ PC = 14 \end{cases} \Rightarrow \boxed{RC = 28}$$

$$6x + 3y = 33$$

$$y = 1$$

$$x - 3y = 2$$

$$7x = 35$$

$$x = 5$$

- * 2. Determine whether WAVE is a parallelogram. Use distance ^{AND} or slope
 $W(2,5)$, $A(3,3)$, $V(-2,-3)$, $E(-3,-1)$

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

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

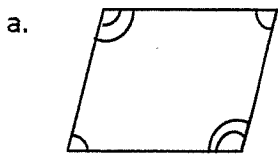
$$M_{\overline{VA}} = \frac{3+3}{3+2} = \frac{6}{5}$$

$$d_{\overline{VA}} = \sqrt{61}$$

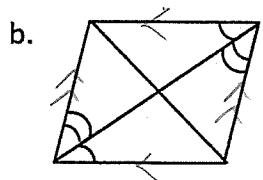
$$d_{\overline{VA}} = \sqrt{(3+2)^2 + (3+3)^2} = \sqrt{25 + 36} = \sqrt{61}$$

Since 1 pr. of opp sides are \cong and parallel, yes, WAVE is a \square .

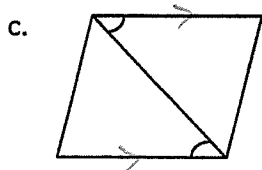
3. Determine if the following quadrilaterals are parallelogram. Justify your answer with a definition or theorem.



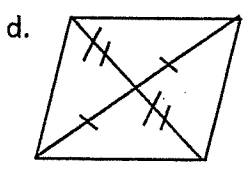
Yes, opp \angle s \cong .



Yes, opp sides \parallel .



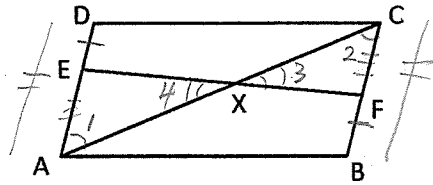
Not enough info.



Yes, diagonals bisect each other

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

a. Given: $\square ABCD$; $\overline{DE} \cong \overline{FB}$
 Prove: \overline{AC} bisects \overline{EF}

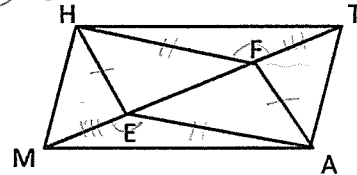


- I Show $\overline{EA} \cong \overline{CF}$
- II Show $\triangle EAX \cong \triangle CFX$
- III Show $\overline{EX} \cong \overline{XF}$

① $\square ABCD \rightarrow$ ② $\overline{DA} \cong \overline{CB}$
 ③ $\overline{DA} = \overline{DE} + \overline{EA}$ } \rightarrow ④ $\overline{DE} + \overline{EA} \cong \overline{CB}$
 ⑤ $\overline{BC} \cong \overline{BF} + \overline{FC}$ } \rightarrow ⑥ $\overline{DE} + \overline{EA} \cong \overline{BF} + \overline{FC}$
 ⑥a $\overline{DE} \cong \overline{FB}$
 \rightarrow ⑦ $\overline{EA} \cong \overline{FC}$
 ⑧ $\overline{DA} \parallel \overline{CB}$ \rightarrow ⑨ $\angle 1 \cong \angle 2$
 ⑩ $\angle 3 \cong \angle 4$ } \rightarrow ⑪ $\triangle EAX \cong \triangle FCX$

- ① Given
- ② $\square \rightarrow$ opp sides \cong
- ③ Segment Addition Postulate
- ④ Substitution
- ⑤ Segmt Add. Post.
- ⑥ Substitution
- ⑥a Given
- ⑦ Subtraction Post.
- ⑧ $\square \rightarrow$ opp sides \parallel
- ⑨ 2 \parallel lines \rightarrow alt. int \angle s \cong
- ⑩ Vertical \angle s \cong
- ⑪ AAS \cong AAS
- ⑫ CPCTC
- ⑬ Def. of seg. bisector

b. Given: $\square HFAE$; $\overline{FM} \cong \overline{ET}$
 Prove: MATH is a \square



① $\square HFAE \rightarrow$ ② $\overline{HF} \cong \overline{EA}$
 \rightarrow ③ $\overline{HF} \parallel \overline{EA} \rightarrow$ ④ $\angle HFT \cong \angle MEA$
 ⑤ $\overline{FM} \cong \overline{ET} \rightarrow$ ⑥ $\overline{ME} \cong \overline{FT}$ } \rightarrow ⑦ $\triangle MEA \cong \triangle FPH$

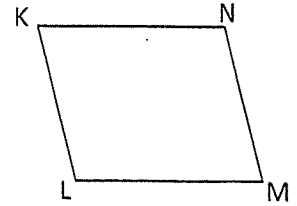
\rightarrow ⑧ $\angle HFT \cong \angle MEA \rightarrow$ ⑨ $\overline{HT} \parallel \overline{MA}$
 \rightarrow ⑩ $\overline{HT} \cong \overline{MA}$ } \rightarrow ⑪ MATH is \square

- ① Given
- ② $\square \rightarrow$ opp sides \cong
- ③ $\square \rightarrow$ opp sides \parallel
- ④ 2 \parallel lines \rightarrow alt. ext. \angle s \cong
- ⑤ Given
- ⑥ Common Segment Thm
- ⑦ SAS \cong SAS
- ⑧ CPCTC
- ⑨ 2 lines & alt. int \angle s $\cong \rightarrow$ 2 \parallel lines
- ⑩ CPCTC
- ⑪ Quad with 1 pr. sides \cong & $\parallel \rightarrow \square$

Geometry (H)
Section 5.1 – more problems

Name: KEY

1. Complete each statement about $\square KLMN$.



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
 $\frac{x}{2} = 2x - 9$
 $x = 4x - 18$
 $18 = 3x$
 $6 = x$
 $KL = \frac{6}{2}$

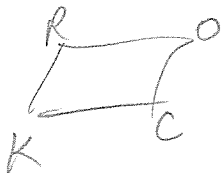
c. If $KL = 8$, $MN = \frac{x^2}{2}$, $x =$ 4 or -4
 $8 = \frac{x^2}{2}$
 $x^2 = 16$
 $x = 4 \text{ or } -4$

d. If $m\angle K = 4x + 11$, $m\angle L = 6x - 1$, $m\angle K =$ 79°
 $4x + 11 + 6x - 1 = 180$
 $10x = 170$
 $x = 17$
 $= 4(17) + 11$
 $= 68 + 11$

e. If $m\angle K = 31$, $m\angle M = 2x^2 - 1$, $m\angle N =$ 149°
 $2x^2 - 1 = 31$
 $2x^2 = 32$
 $x^2 = 16$
 $x = \pm 4$
 $180 - 31 = 149$

f. If $m\angle L = x - 40$, $m\angle N = \frac{3x}{4}$, $m\angle L =$ 120°
 $x - 40 = \frac{3x}{4}$
 $4x - 160 = 3x$
 $x = 160$

2. ROCK is a parallelogram. $m\angle R = x + 3y$, $m\angle O = x - 4$, $m\angle C = 4y - 8$. Find $m\angle K$.



$$\begin{array}{l} x + 3y = 4y - 8 \\ x + 3y + x - 4 = 180 \end{array} \rightarrow \begin{array}{l} x = y - 8 \\ x = 32 \end{array}$$

$$\begin{array}{l} 2x + 3y = 184 \\ 2(y - 8) + 3y = 184 \\ 2y - 16 + 3y = 184 \\ 5y = 200 \\ y = 40 \end{array} \quad \begin{array}{l} m\angle C = 4y - 8 \\ 4(40) - 8 \\ = 160 - 8 \\ = 152 \end{array}$$

$$m\angle K = 180 - 152 = \boxed{28^\circ}$$

CK
 $m\angle R = x + 3y$
 $32 + 120 = 152^\circ \checkmark$

3. XYZW is a parallelogram. $XZ + YW = 52$

Find QZ.

$$4a - 10 = 3a - 5$$

$$a = 5$$

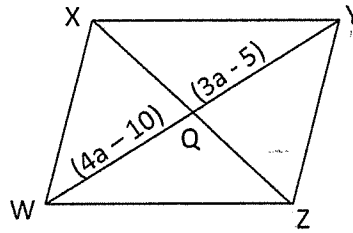
$$\left. \begin{array}{l} WQ = 10 \\ YQ = 10 \end{array} \right\} WY = 20$$

$$XZ + 20 = 52$$

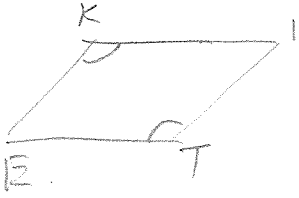
$$XZ = 32$$

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

$$QZ = 16$$



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



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

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

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

$$x = -12 \quad x = 5$$

$$m\angle T = -36 + 60$$

$$= 24$$

$$\text{ck: } m\angle K = 144 - 120$$

$$= 24$$

$$m\angle T = 15 + 60$$

$$= 75$$

$$m\angle K = 25 + 50$$

$$= 75$$

$m\angle E$:

$$180$$

$$-24$$

$$\hline 156$$

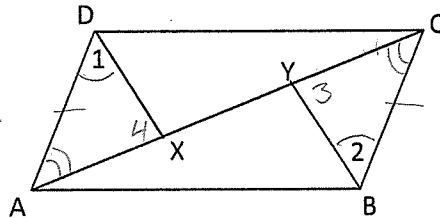
$$\left. \begin{array}{r} 180 \\ -75 \\ \hline 105 \end{array} \right\} \text{ or } 105$$

5. Write a flow proof.

Given: $\square ABCD$; $\angle 1 \cong \angle 2$

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

Show $\triangle ADX \cong \triangle CBY$
(ASA)



- ① $\square ABCD \rightarrow$ ② $\overline{DA} \parallel \overline{CB} \rightarrow$ ③ $\angle DAX \cong \angle CBY$
 \rightarrow ④ $\overline{DA} \cong \overline{CB}$
 ⑤ $\angle 1 \cong \angle 2$ } \rightarrow ⑥ $\triangle ADX \cong \triangle CBY$
 \rightarrow ⑦ $\angle 3 \cong \angle 4 \rightarrow$ ⑧ $\overline{DX} \parallel \overline{BY}$

① Given

② $\square \rightarrow$ opp sides \parallel

③ If 2 \parallel lines \rightarrow alt. int. $\angle s \cong$

④ $\square \rightarrow$ opp sides \cong

⑤ Given

⑥ $ASA \cong ASA$

⑦ CPCTC

⑧ If 2 lines \rightarrow alt. ext. $\angle s \cong \rightarrow$ 2 \parallel lines