

Name KEY

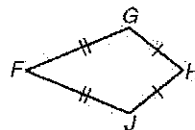
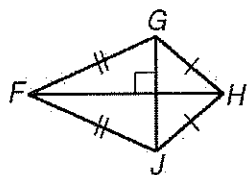
Date _____

Period _____

Notes 6-5: Properties of Kites and Trapezoids

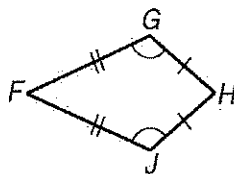
Objective: 1. Use properties of kites to solve problems.
2. Use properties of trapezoids to solve problems.

A KITE is a quadrilateral with exactly two pairs of congruent consecutive sides. If a quadrilateral is a kite, such as $FGHJ$, then it has the following properties.

**Properties of Kites**

$$\overline{FH} \perp \overline{GJ}$$

The diagonals are PERPENDICULAR.



$$\angle G \cong \angle J$$

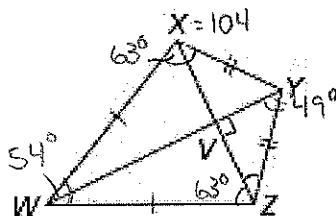
Exactly one pair of opposite ANGLES is congruent.

In kite $WXYZ$, $m\angle WXY = 104^\circ$, and $m\angle VYZ = 49^\circ$. Find each measure.

1. $m\angle VZY =$ 41°

2. $m\angle VXW =$ 63°

3. $m\angle XWZ =$ 54°

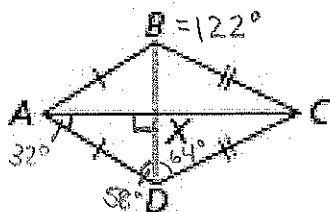


In kite $ABCD$, $m\angle DAX = 32^\circ$, and $m\angle XDC = 64^\circ$. Find each measure.

4. $m\angle XDA =$ 58°

5. $m\angle ABC =$ 122°

6. $m\angle BCD =$ 52°

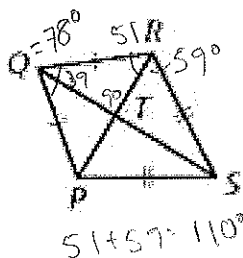


In kite $PQRS$, $m\angle PQR = 78^\circ$, and $m\angle TRS = 59^\circ$. Find each measure.

7. $m\angle QRT =$ 51°

8. $m\angle QPS =$ 110°

9. $m\angle PSR =$ 62°

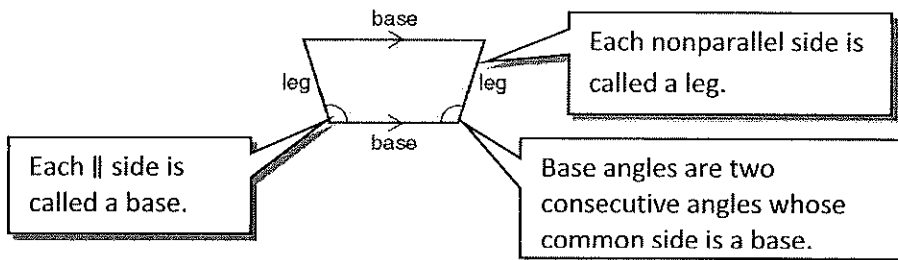


$$\begin{array}{r} 180 \\ -129 \\ \hline 51 \end{array}$$

$$\begin{array}{r} 59 \\ +59 \\ \hline 118 \end{array}$$

$$\begin{array}{r} 180 \\ -118 \\ \hline 62 \end{array}$$

A TRAPEZOID is a quadrilateral with exactly one pair of parallel sides. If the legs of a trapezoid are congruent, the trapezoid is an ISOSCELES trapezoid.



Isosceles Trapezoid Theorems

- In an isosceles trapezoid, each pair of base angles is CONGRUENT.
- If a trapezoid has one pair of congruent base angles, then it is ISOSCELES.
- A trapezoid is isosceles if and only if its LEGS are congruent.

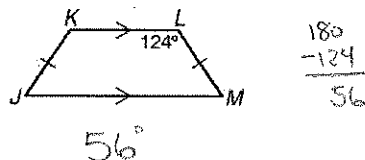
In kite $ABCD$, $m\angle BCD = 98^\circ$, and $m\angle ADE = 47^\circ$. Find each measure.

10. $m\angle DAE = \underline{43^\circ}$

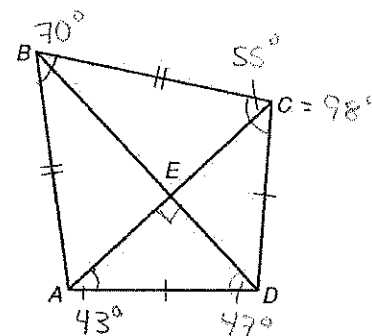
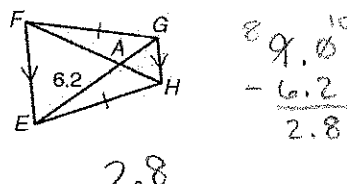
11. $m\angle BCE = \underline{55^\circ}$

12. $m\angle ABC = \underline{70^\circ}$

13. Find $m\angle J$ in trapezoid $JKLM$.

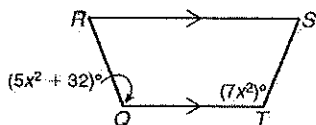


14. In trapezoid $EFGH$, $FH = 9$. Find AG .

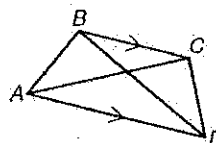


Find each value so that the trapezoid is isosceles.

15. Find the value of x .



16. $AC = (2z + 9)$, $BD = (4z - 3)$. Find the value of z .



$$\begin{aligned} 2z + 9 &= 4z - 3 \\ -2z + 3 &-2z + 3 \\ 12 &= 2z \\ z &= 6 \end{aligned}$$

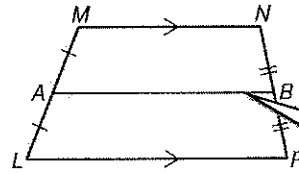
$z = \underline{6}$

Trapezoid Midsegment Theorem

The MIDSEGMENT of a trapezoid is the segment whose endpoints are the midpoints of the legs.

- The midsegment of a trapezoid is parallel to each base. $\overline{AB} \parallel \overline{MN}$ and $\overline{AB} \parallel \overline{LP}$
- The length of the midsegment is ONE - HALF the sum of the length of the bases.

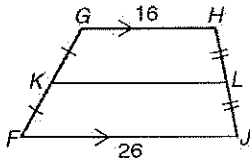
$$AB = \frac{1}{2}(MN + LP)$$



\overline{AB} is the midsegment of LMNP.

Find each length.

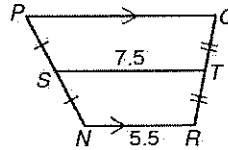
17. KL



$$26 + 16 = \frac{42}{2}$$

$$KL = 21$$

18. PQ



$$2 \cdot (5.5 + x) \cdot \frac{1}{2} = 7.5 \cdot 2$$

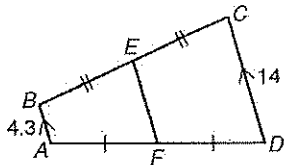
$$5.5 + x = 15.0$$

$$\quad \quad \quad - 5.5$$

$$\quad \quad \quad \hline \quad \quad \quad x = 9.5$$

$$PQ = 9.5$$

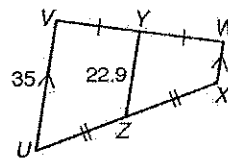
19. EF



$$2 \sqrt{18.3}$$

$$EF = 9.15$$

20. WX



$$2 \cdot (35 + x) \cdot \frac{1}{2} = 22.9 \cdot 2$$

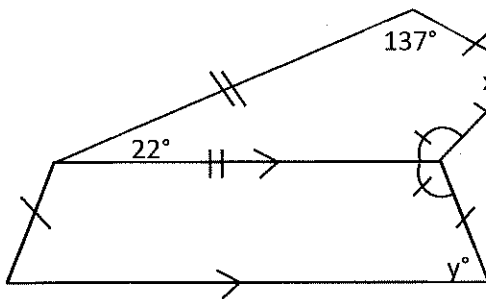
$$45.8$$

$$\quad \quad \quad - 35$$

$$\quad \quad \quad \hline \quad \quad \quad 10.8$$

$$WX = 10.8$$

21. $x = 64^\circ$, $y = 43^\circ$

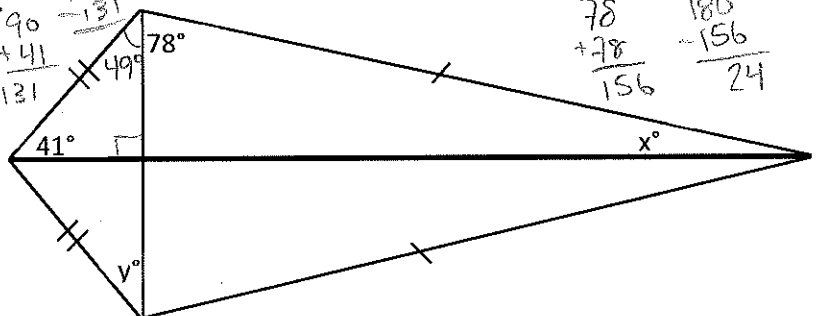


$$\begin{array}{r} 137 \\ \times 2 \\ \hline 274 \end{array}$$

$$\begin{array}{r} 360 \\ - 296 \\ \hline 64 \end{array}$$

$$\begin{array}{r} 180 \\ - 137 \\ \hline 43 \end{array}$$

22. $x = 24^\circ$, $y = 49^\circ$



$$\begin{array}{r} 180 \\ - 131 \\ \hline 49 \end{array}$$

$$\begin{array}{r} 78 \\ + 78 \\ \hline 156 \end{array}$$

$$\begin{array}{r} 180 \\ - 156 \\ \hline 24 \end{array}$$

QUADRILATERALS

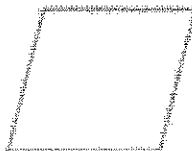
Parallelogram



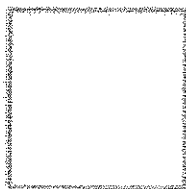
Rectangle



Rhombus



Square



Trapezoid

1. BASES ARE PARALLEL
2. SAME SIDE \angle 'S ARE SUPPLEMENTARY

Isosceles Trapezoid

1. BASES ARE PARALLEL
2. LEGS ARE \cong
UPPER BASE \angle 'S ARE \cong
3. LOWER BASE \angle 'S ARE \cong
4. UPPER BASE \angle 'S ARE SUPPLEMENTARY TO LOWER BASE \angle 'S
5. DIAGONALS ARE \cong

Kite

1. 2 PAIR OF \cong ADJACENT SIDES
2. \cong \angle 'S CREATED BY NON CONGRUENT SIDES
3. LONG DIAGONAL IS \perp BISECTOR OF SHORT DIAGONAL