

Unit 9 Review Sheet (Quadrilaterals)

Fill in the following special properties for each quadrilateral:

## 1. Properties of a Parallelogram:

- Opposite sides are  $\parallel$
- Opposite sides are  $\cong$
- Opposite angles are  $\cong$
- Diagonals bisect each other
- Consecutive angles are supplementary

## 2. Properties of a Rectangle:

- Has all the properties of a parallelogram
- Diagonals are  $\cong$
- 4 right  $\angle$ 's

## 3. Properties of a Rhombus:

- Has all the properties of a parallelogram
- Diagonals bisect angles
- 4  $\cong$  sides
- Diagonals are  $\perp$

## 4. Properties of a Square:

- Has all the properties of a rhombus
- 4  $\cong$  sides
- 4  $\cong$  angles (right  $\angle$ 's)
- Diagonals are  $\cong/\perp$  (also bisect  $\angle$ 's)

## 5. Properties of a Trapezoid:

- Has at least one pair of  $\parallel$  sides
- Consecutive  $\angle$ 's from different bases are supplementary

## 6. Properties of an Isosceles Trapezoid:

- Has all the properties of a trapezoid
- Legs are  $\cong$
- Base  $\angle$ 's are  $\cong$
- Diagonals are  $\cong$

7. Ways to prove a quadrilateral is a Parallelogram:

- 
- 
- 
- 

8. Ways to prove a quadrilateral is a Rectangle:

- 
- 
- 

9. Ways to prove a quadrilateral is a Rhombus:

- 
- 
- 
- 

10. Ways to prove a quadrilateral is a Square:

- 
- 

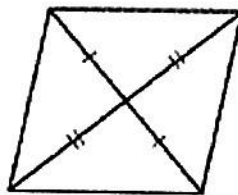
Practice Problems:

Are you given enough information to determine whether the quadrilateral is a parallelogram? Explain.

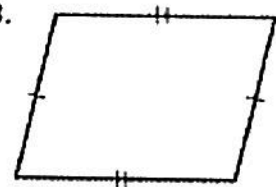
1.



2.



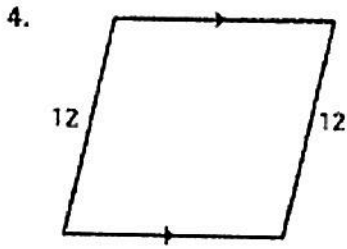
3.



Yes/No because one  
pair of opp. sides is  
both  $\cong$  and  $\parallel$

Yes/No because the  
diagonals bisect  
each other

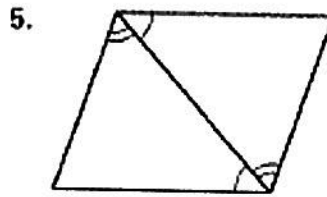
Yes/No because two  
pairs of opp. sides  
are  $\cong$



Yes/No because \_\_\_\_\_

\_\_\_\_\_

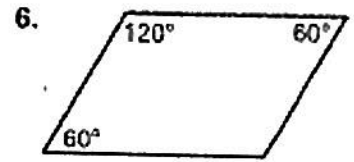
\_\_\_\_\_



Yes/No because \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

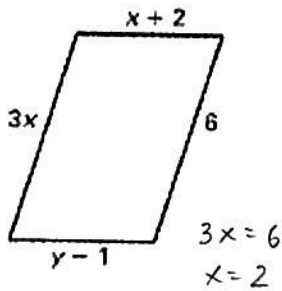


Yes/No because \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

7. What value of  $x$  and  $y$  will make the polygon a parallelogram?



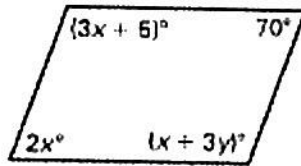
$$3x = 6$$

$$x = 2$$

$$y - 1 = (2) + 2$$

$$y - 1 = 4$$

$$y = 5$$



$$2x = 70$$

$$x = 35$$

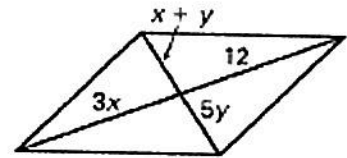
$$3x + 5 = x + 3y$$

$$3(35) + 5 = (35) + 3y$$

$$105 + 5 = 35 + 3y$$

$$110 = 35 + 3y$$

$$y = 25$$



$$3x = 12$$

$$x = 4$$

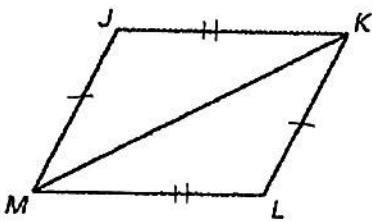
$$x + y = 5y$$

$$(4) + y = 5y$$

$$4 = 4y$$

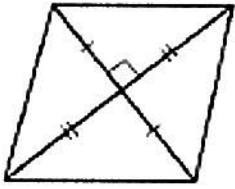
$$y = 1$$

8. Given:  $\triangle MJK \cong \triangle KLM$   
Prove:  $MJKL$  is a parallelogram.

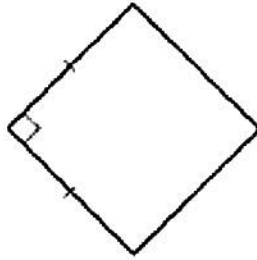


S	R
① $\triangle MJK \cong \triangle KLM$	① Given
② $\overline{JM} \cong \overline{LK}$ $\overline{JK} \cong \overline{ML}$	② CPCTC
③ $MJKL$ is a $\square$	③ When a quadrilateral has 2 pairs of $\cong$ opp. sides, it is a $\square$ .

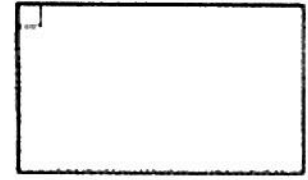
Each figure is a parallelogram. Identify the special type and explain your reasoning.



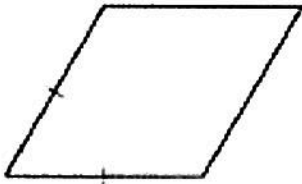
It's a rhombus because  
the diagonals  
are  $\perp$



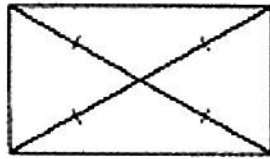
It's a square because  
it has a right  $\angle$  and  
 $\cong$  adjacent sides



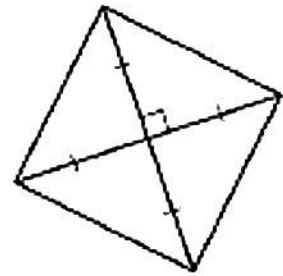
It's a rectangle because  
it has a right  $\angle$



It's a rhombus because  
it has  $\cong$   
adjacent sides



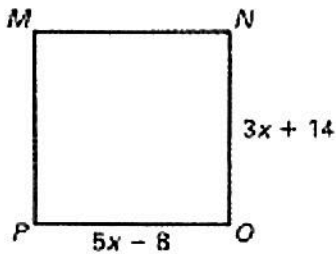
It's a rectangle because  
diagonals are  
 $\cong$



It's a square because  
the diagonals are  
 $\cong$  and  $\perp$

Find the value of  $x$ .

$MNOP$  is a square.

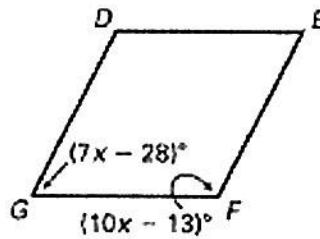


$$5x - 8 = 3x + 14$$

$$2x = 22$$

$$x = 11$$

$DEFG$  is a rhombus.



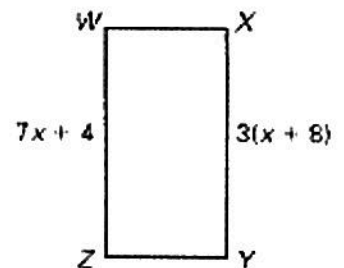
$$7x - 28 + 10x - 13 = 180$$

$$17x - 41 = 180$$

$$17x = 221$$

$$x = 13$$

$WXYZ$  is a rectangle.

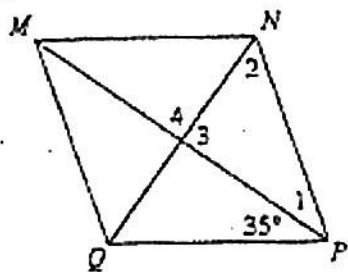


$$7x + 4 = 3x + 24$$

$$4x = 20$$

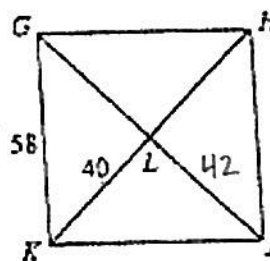
$$x = 5$$

8.  $MNPQ$  is a rhombus. Find the measure of each angle.



$m\angle 1$  35       $m\angle NMQ$  70  
 $m\angle MNP$  110       $m\angle 2$  55  
 $m\angle 3$  90       $m\angle 4$  90

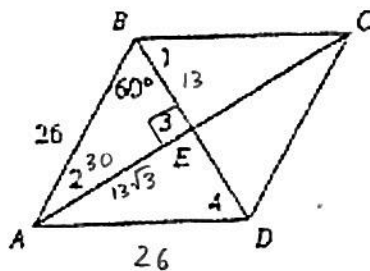
9.  $GHJK$  is a rhombus, with  $LJ = 42$ . Find the length of each segment.



$GH$  58       $HJ$  58  
 $LJ$  42       $LH$  40  
 $KH$  80

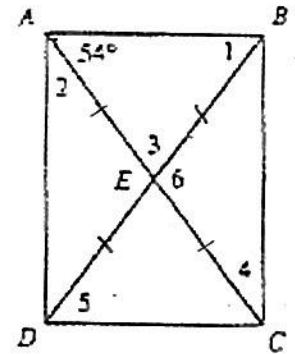
10.  $ABCD$  is a rhombus. Find each angle measure or segment length.

$m\angle 1$  60       $m\angle DAB$  60  
 $m\angle 2$  30       $m\angle 3$  90  
 $m\angle 4$  60       $AD$  26  
 $BD$  26       $ED$  13



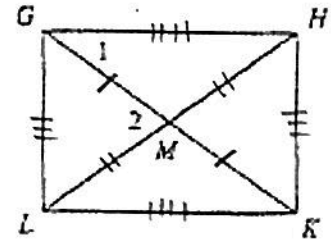
$ABCD$  is a rectangle, with  $AC = 18$ . Find each length or angle measure.

11.  $m\angle BCD$  90      12.  $m\angle 1$  54      13.  $m\angle 2$  36  
 14.  $m\angle 3$  72      15.  $m\angle 4$  36      16.  $m\angle 5$  54  
 17.  $m\angle 6$  108      18.  $AE$  9      19.  $DB$  18

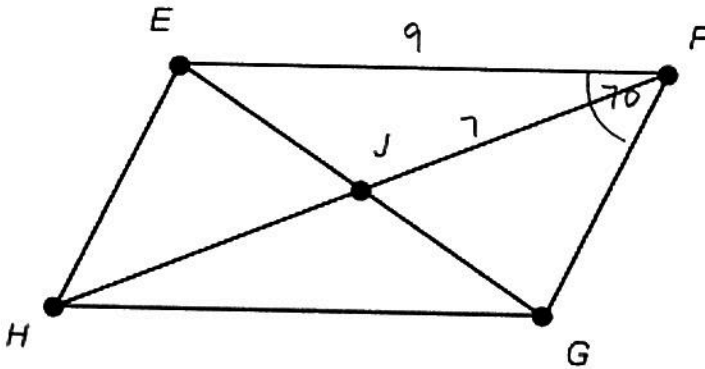


$GHLK$  is a rectangle (not a square). Answer with true or false

20.  $GHLK$  and its diagonals form four congruent triangles. F  
 21.  $GHLK$  and its diagonals form four isosceles triangles. T  
 22.  $\angle 1 \cong \angle 3$  F  
 23.  $\triangle GHL \cong \triangle KHL$  T  
 24.  $\overline{GK}$  is a line of symmetry. F  
 25.  $\triangle GML \cong \triangle HMK$  T  
 26.  $\overline{GK} \cong \overline{HL}$  T



27. Fill in the following chart given the following information about the below parallelogram.  $EF = 9$ ,  $m\angle EFG = 70$ ,  $JF = 7$ .

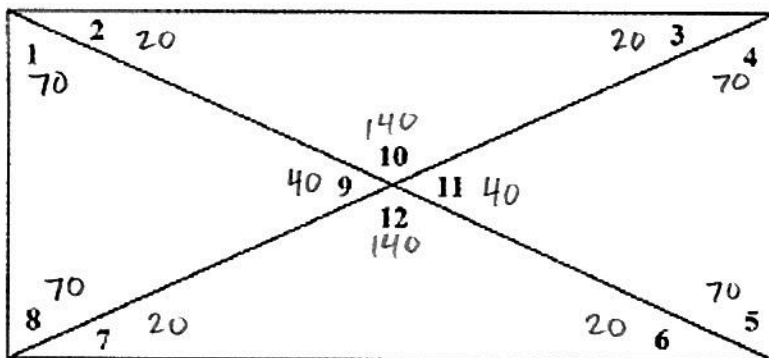


Measure	Explanation
$m\angle EHG = 70$	Opp. $\angle$ 's of a $\square$ are $\cong$
$HG = 9$	Opp sides of a $\square$ are $\cong$
$m\angle FGH = 110$	consecutive $\angle$ 's of a $\square$ are supp.
$JH = 7$	diagonals of a $\square$ bisect each other

Fill in all the numbered angles with the appropriate angle measures.

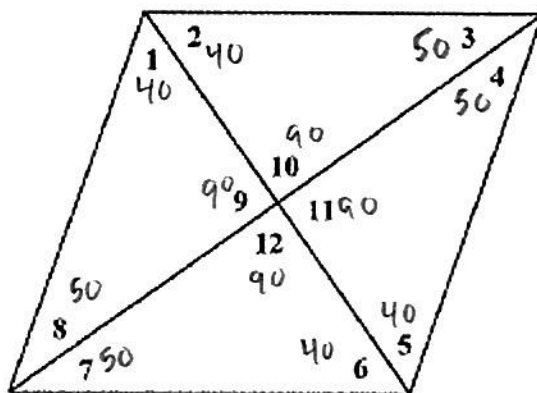
**RECTANGLE...**

$m\angle 1 = 70^\circ$

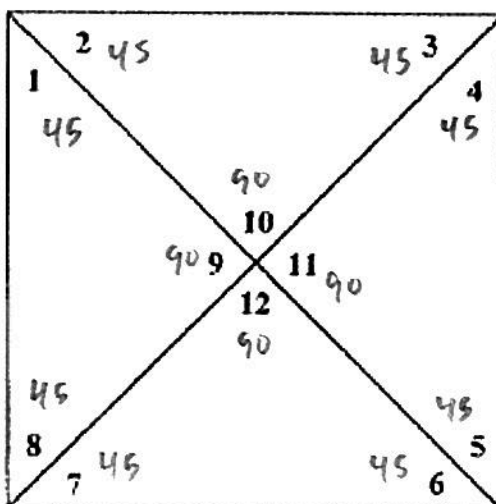


**RHOMBUS...**

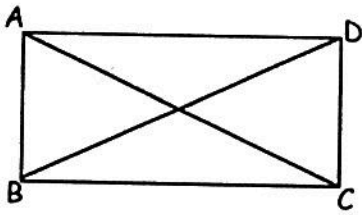
$m\angle 1 = 40^\circ$



**SQUARE...**



28.



Given: Parallelogram ABCD

$$\triangle ABC \cong \triangle DCB$$

Prove: ABCD is a rectangle

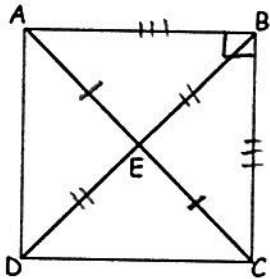
S	R
① $\square$ ABCD	① Given
② $\triangle ABC \cong \triangle DCB$	② Given
③ $\overline{AC} \cong \overline{BD}$	③ CPCTC
④ ABCD is a $\square$	④ In a parallelogram, when diagonals are $\cong$ it is a rectangle.

29.

Given:  $AE \cong EC, ED \cong EB$

$AB \perp BC, AB \cong BC$

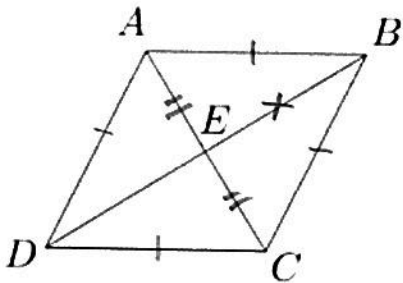
Prove: ABCD is a square



S	R
① $\rightarrow$	① Given
② ABCD is a $\square$	② When a quadri. has diagonals that bisect each other it is a $\square$ .
③ $\angle B$ is a right $\angle$	③ $\perp$ lines form right $\angle$ 's
④ ABCD is a $\square$	④ When a $\square$ has a right angle it is a $\square$ .
⑤ ABCD is a square	⑤ In a $\square$ , when adjacent sides are $\cong$ it is a square.

30. Given: Rhombus ABCD with diagonals meeting at E

Prove:  $\triangle AEB \cong \triangle CEB$

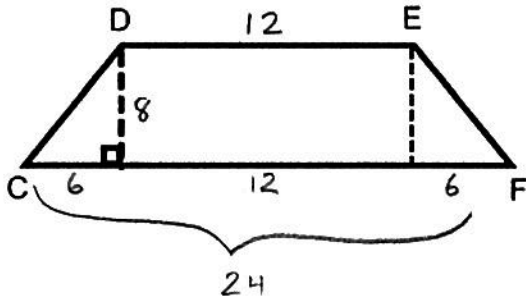


S	R
① Rhombus ABCD	① Given
② $\overline{AE} \cong \overline{CE}$	② The diagonals of a rhombus bisect each other
③ $\overline{AB} \cong \overline{BC}$	③ All sides of a rhombus are $\cong$
④ $\overline{EB} \cong \overline{EB}$	④ Reflexive Property
⑤ $\triangle AEB \cong \triangle CEB$	⑤ SSS $\cong$ SSS



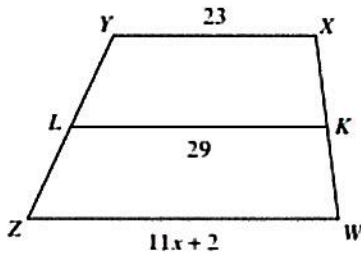
## Trapezoid Practice!

1. In Trapezoid CDEF below, the measure of base DE = 12 and the measure of base CF = 24. If the trapezoid has an altitude of 8, what is the measure of CD? Hint: you are going to need to use the Pythagorean Theorem.



$$\begin{aligned}
 a^2 + b^2 &= c^2 \\
 6^2 + 8^2 &= c^2 \\
 36 + 64 &= c^2 \\
 100 &= c^2 \\
 c &= 10 \\
 \overline{CD} &= 10
 \end{aligned}$$

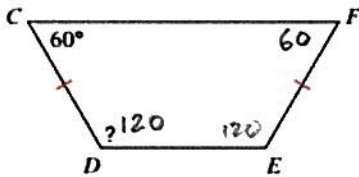
2. Solve for x:



$$\begin{aligned}
 2(29) &= 23 + 11x + 2 \\
 58 &= 25 + 11x \\
 \underline{-25} \quad \underline{-25} & \\
 33 &= 11x \\
 x &= 3
 \end{aligned}$$

★ Trapezoid CDEF

3. What is the missing angle measure? What is the measure of Angle E?



$$\begin{aligned}
 ? &= 120 \\
 \angle E &= 120
 \end{aligned}$$

★ Trapezoid ABCD

4. If the measure of Angle ABD = 75 and the measure of Angle CBD = 40, what is the measure of the following:

- Angle A? → 65
- Angle ~~ADB~~?  
BDA → 40

