Name:_____ Period_____ GL

UNIT 9: POLYGONS AND QUADRILATERALS

I can define, identify and illustrate the following terms:

Polygon
Regular Polygon
Irregular Polygon
Concave
Convex
Quadrilateral
Pentagon
Hexagon
Heptagon
Octagon
Nonagon
Decagon
Dodecagon
n-gon
Parallelogram
Rhombus
Diagonal
Kite
Isosceles trapezoid

Dates, assignments, and quizzes subject to change without advance notice.

Monday	Tuesday	Block Day	Friday
28 Classify Polygons	29 Polygons and Angles	30/31 Discovery of Properties	1 Discovery of Properties
4 Using Properties	5 Using Properties	6/7 Proving and Constructions	8 Trapezoid and Kites
11 Trapezoid and Kites	12 Review	13/14 **TEST**	

Monday, 1/28

Naming and Classifying Polygons

- ☐ I can name polygons
- ☐ I can classify polygons

PRACTICE: Complete Vocabulary Worksheet

Tuesday, 1/29

Angles in Polygons

- ☐ I can find the sum of the measures of the interior angles in a polygon.
- ☐ I can find the sum of the measures of the exterior angles in a polygon.
- ☐ I can determine the polygon given the sum of the interior angles.
- ☐ I can determine the regular polygon given the measure of one interior angle or one exterior angle.

Practice: Angles in Polygons Practice Part 1

Wednesday or Thursday, 1/30 – 1/31

Properties of Parallelograms and Special Parallelograms **QUIZ: POLYGONS**

- ☐ I can state the properties of a parallelogram
- ☐ I can state the properties of the different special parallelograms
- ☐ I can compare and contrast the properties of a parallelogram, rectangle, rhombus, and square.

PRACTICE: Angles in Polygons Practice Part 2

Friday, 2/1

Properties of Parallelograms and Special Parallelograms

- ☐ I can state the properties of a parallelogram
- ☐ I can state the properties of the different special parallelograms
- ☐ I can compare and contrast the properties of a parallelogram, rectangle, rhombus, and square.

PRACTICE: Quadrilaterals Properties Homework

Monday, 2/4

Using Properties of Parallelograms and Special Parallelograms

- ☐ I can use the properties of a parallelogram to solve problems
- ☐ I can use the properties of the different special parallelograms to solve problems.
- ☐ I can use the relationships of the special parallelograms and parallelograms to answer questions.

PRACTICE: Using Properties of Parallelograms Worksheet #1-24

Tuesday, 2/5

Using Properties of Parallelograms and Special Parallelograms

- ☐ I can use the properties of a parallelogram to solve problems
- ☐ I can use the properties of the different special parallelograms to solve problems.
- ☐ I can use the relationships of the special parallelograms and parallelograms to answer questions.

PRACTICE: Using Properties of Parallelograms Worksheet #25-39

Wednesday or Thursday, 2/6 – 2/7

Proving and Constructing Parallelograms and Special Parallelograms

- ☐ I can prove that a quadrilateral is a parallelogram, rectangle, rhombus, or square.
- ☐ I can justify that 4 points on a coordinate plane create a parallelogram, rectangle, rhombus, or square.
- ☐ I can recognize the construction of parallel lines and perpendicular lines used to create a specific quadrilateral.

PRACTICE: Quadrilaterals in a Coordinate Plane Worksheet

Friday, 2/8

Properties of Kites and Trapezoids

- ☐ I can use the properties of a kite to solve problems.
- ☐ I can use the properties of a trapezoid or isosceles trapezoid to solve problems.

PRACTICE: Trapezoids and Kites Assignment #1

Monday, 2/11

Properties of Kites and Trapezoids

- ☐ I can use the properties of a kite to solve problems.
- ☐ I can use the properties of a trapezoid or isosceles trapezoid to solve problems.
- ☐ I can prove that a quadrilateral is a kite, trapezoid, or isosceles trapezoid.
- ☐ I can justify that 4 points on a coordinate plane create a kite, trapezoid, or isosceles trapezoid.

PRACTICE: Trapezoids and Kites Assignment #2

Tuesday, 2/12

Review

PRACTICE: Review Worksheet

Wednesday or Thursday, 2/13 – 2/14

Test #9: Polygons and Quadrilaterals

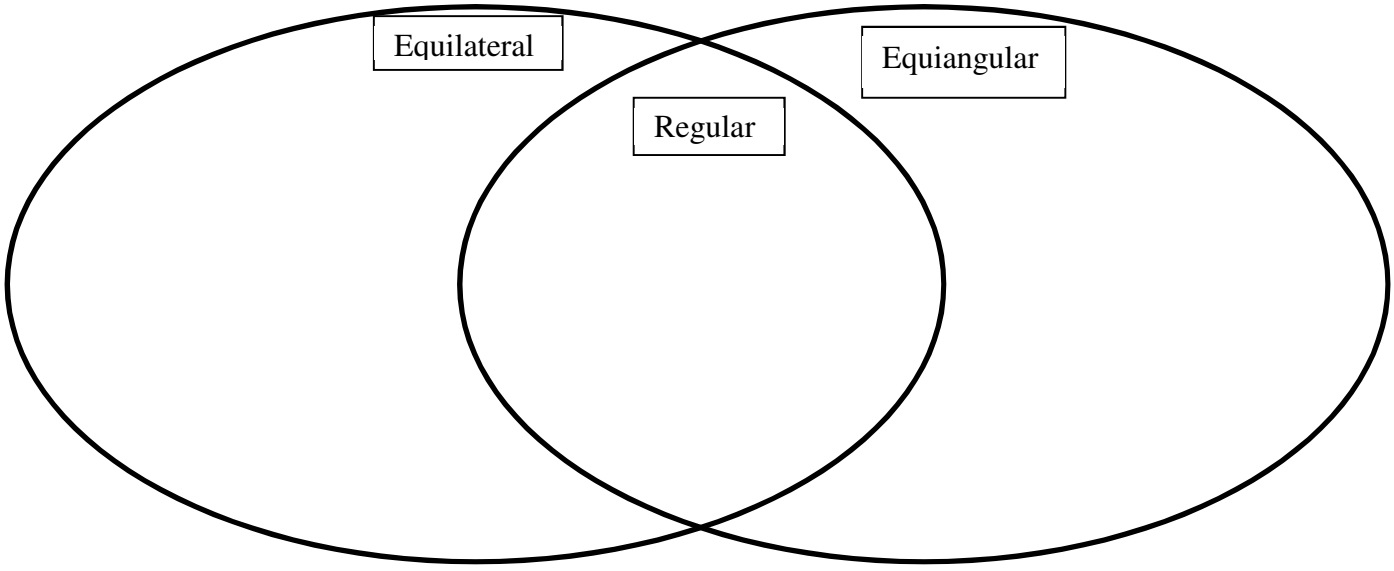
Name _____ Period ____ 9/29 – 10/7/08 GL

Vocabulary Notes

NUMBER OF SIDES	NAME OF POLYGON
3	
4	
5	
6	
7	
8	
9	
10	
12	
n	

Describe the following vocabulary terms based on the given examples.

Polygons	Non - Polygons
Convex	Concave



Irregular Polygons : _____

Vocabulary Assignment

1) Tell why each shape is or is not a polygon. If it is a polygon, name it by the sides.

A.

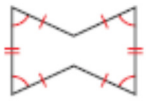
B.

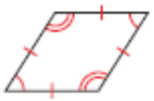
C.

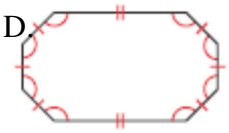
D.

2) Tell why each shape is regular or irregular.

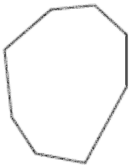
A.

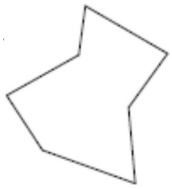
B 

C. 

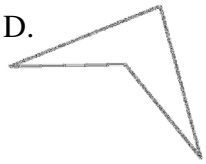
D 

3) Tell why each shape is convex or concave.

A. 

B 

C.

D. 

4) Draw the following, or tell why it cannot be drawn.

A. Concave equilateral pentagon

B. Concave trapezoid

C. Irregular Equilateral triangle

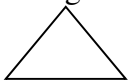
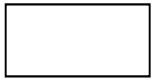
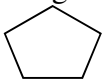
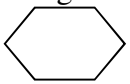
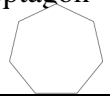
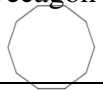
D. Convex irregular heptagon

5) Tell whether each statement is Always, Sometimes, or Never true.

A. An equiangular triangle is a regular convex polygon
B. A convex pentagon is a regular polygon
C. A equilateral dodecagon is equiangular
D. A concave polygon is irregular.
E. Regular octagons are similar polygons.
F. A dodecagon has 12 sides.
G. A nine sided polygon is a nonagon.

6) As the number of sides increases in a regular polygon, what geometric shape does it approach?

7) If 2 polygons are similar, then what is true about their angles and their sides?

Name of polygon	Number of Sides	Number of Diagonals from a vertex	Number of triangles in polygon	Sum of interior angles	Measure of one interior angle (Regular Only)	Measure of one exterior angle (Regular Only)	Sum of exterior angles
Triangle 							
Quadrilateral 							
Pentagon 							
Hexagon 							
Heptagon 							
Octagon							
Nonagon							
Decagon 							
n-gon							

Angles in Polygons – Assignment Part 1

I. Fill in the chart for the regular polygons.

Polygon	Sum of Interior ∠'s	Each Interior ∠	Sum of Exterior ∠'s	Each Exterior ∠
octagon				
heptagon				
20-gon				
pentagon				
	1440°			
12-gon				
18-gon				
hexagon				
				40°
36-gon				
		60°		
				90°
72-gon				

II. Solve the following word problems.

1) If the sum of the interior angles is 1980°, what is the name of the polygon?

2) If each of the exterior angles is 15°, what is the name of the polygon?

3) If each on the interior angles is 108°, what is the name of the polygon?

4) If it is a decagon, what is the sum of the exterior angles?

5) If the sum of the interior angles is 3600°, what is the name of the polygon?

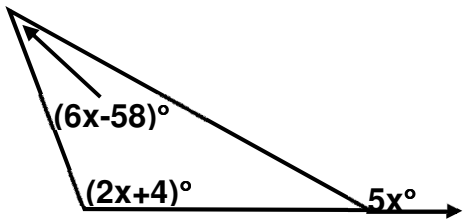
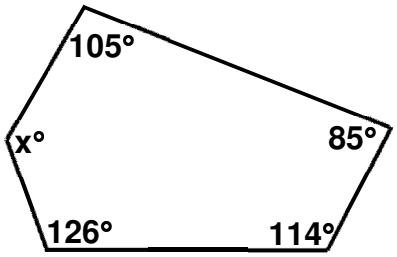
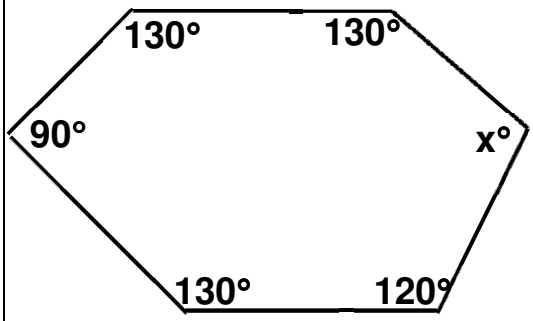
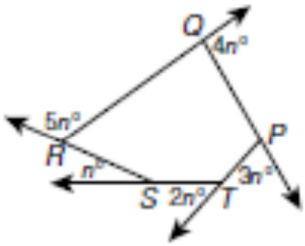
6) If each of the exterior angles is 24°, what is the name of the polygon?

7) If each of the interior angles is 135°, what is the name of the polygon?

8) If each of the exterior angles is 60°, what is the name of the polygon?

9) If each interior angle is 160°, what is the name of the polygon?

Find the value of x in each of the following.

10. x =_____	
11. x = _____	
12. x = _____	
13. n = _____	

Angles in Polygons – Assignment Part 2

The sum of the interior angles of a polygon is the same as the sum of its exterior angles. What type of polygon is it?

A quadrilateral

B hexagon

C octagon

D decagon

The measures of the interior angles of a pentagon are $2x, 6x, 4x-6, 2x-16,$ and $6x+2$. What is the measure, in degrees, of the largest angle?

A 28

B 106

C 170

D 174

A regular polygon has 12 sides. What is the measure of each exterior angle?

A 15°

B 30°

C 45°

D 60°

What is the measure of an exterior angle of a regular hexagon?

A 30°

B 60°

C 120°

D 180°

If the measure of an exterior angle of a regular polygon is 120°, how many sides does the polygon have?

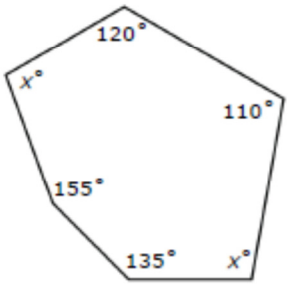
A 3

B 4

C 5

D 6

Which equation could best be used to determine the value of x?



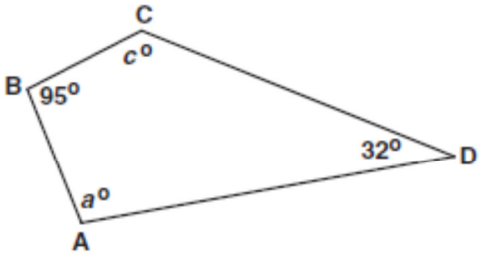
A $120° + 110° + x° + 135° + 155° + x° = 720°$

B $120° + 110° + x° + 135° + 155° + x° = 540°$

C $120° + 110° + x° + 135° + 155° + x° = 360°$

D $120° + 110° + x° + 135° + 155° + x° = 180°$

For the quadrilateral shown below, what is $m\angle a + m\angle c$?



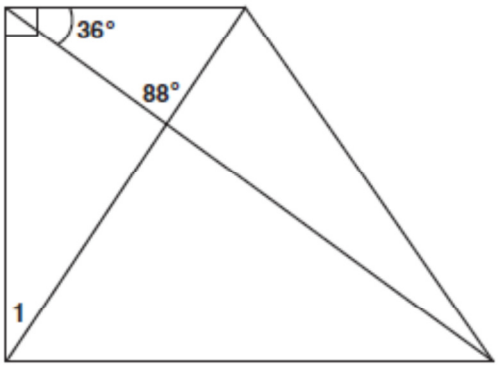
A 53°

B 137°

C 180°

D 233°

What is $m\angle 1$?



A 34°

B 56°

C 64°

D 92°

The sum of the interior angles of a polygon of n sides is

(1) 360

(2) $\frac{360}{n}$

(3) $(n-2)\cdot 180$

(4) $\frac{(n-2)\cdot 180}{n}$

Three interior angles of a convex heptagon measure 125°, and two of the interior angles measure 143°. Which are possible measures for the other two interior angles of the heptagon?

F 48° and 48°

G 39° and 100°

H 100° and 116°

J 89° and 150°

For which polygon does the sum of the measures of the interior angles equal the sum of the measures of the exterior angles?

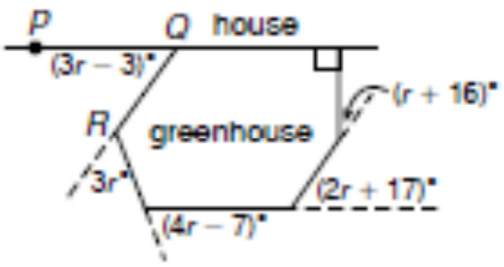
(1) hexagon

(2) pentagon

(3) quadrilateral

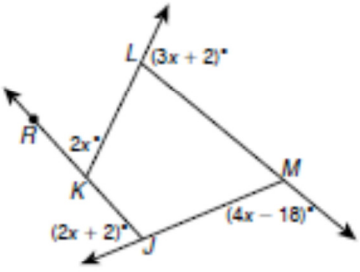
(4) triangle

Find the value of r.



A pentagon has two exterior angles that measure $(3x)°$, two exterior angles that measure $(2x + 22)°$, and an exterior angle that measures $(x + 41)°$. If all of these angles have different vertices, what are the measures of the exterior angles of the pentagon?

Find the measure of $\angle RKL$.



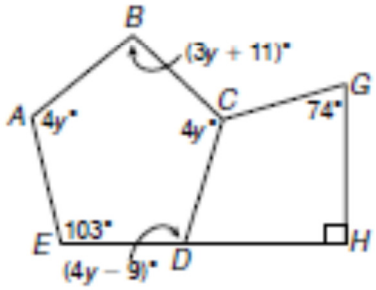
A 34°

B 68°

C 86°

D 148°

What is the measure of $\angle GCD$?



F 123°

G 116°

H 73°

J 29°

Quadrilaterals Discovery

Use the 4 figures and patty paper to answer the following questions. There may be more than one answer to each question. ALWAYS LIST ALL THAT APPLY.

1. Which of these figures have congruent sides? How do you know they are congruent? Which sides are congruent? State the congruencies.

2. Which of these figures have congruent corner angles? How do you know they are congruent? Which angles are congruent? State the congruencies.

3. Are there any other angles in each figure that are congruent? How do you know they are congruent? State all congruent pairs.

4. Which of these figures have right angles in the corners? How do you know they are right angles? Are all corners right angles in these figures, or just some?

5. Which of these figures have bisected diagonals? How do you know they are bisected? Which pieces are congruent? State the congruencies.

6. Which of these figures have congruent diagonals? How do you know they are congruent? State the congruencies?

7. Which of these figures have bisected corner angles? How do you know they are bisected? State the congruencies.

8. Which of these figures have perpendicular diagonals? How do you know they are perpendicular?

9. Which of these figures have congruent triangles in them? Is there more than one pair of congruent triangles? List all congruent triangle pairs for each figure? How do you know they are congruent (which theorem did you use – SSS, SAS, ASA, AAS, HL)?

10. List all segment addition and angle addition equations for each figure. (Part + Part = whole)

SUMMARY:

Figure 1: Type of quadrilateral _____
List of properties that apply to figure 1:

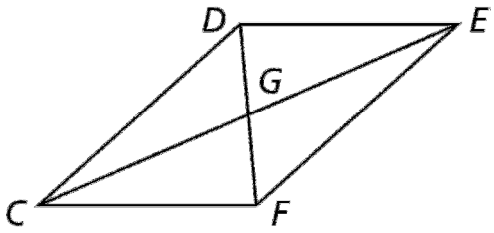
Figure 2: Type of quadrilateral _____
List of properties that apply to figure 2:

Figure 3: Type of quadrilateral _____
List of properties that apply to figure 3:

Figure 4: Type of quadrilateral _____
List of properties that apply to figure 4:

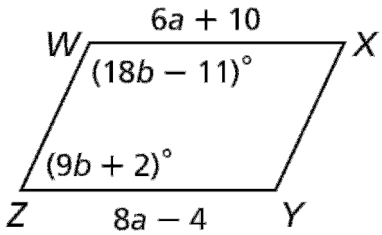
Quadrilaterals Examples (in PPT):

1. In $\square$ *CDEF*, *DE* = 74 mm, *DG* = 31 mm, and m∠*FCD* = 42°.
Find *CF*.
Find m∠*EFC*.



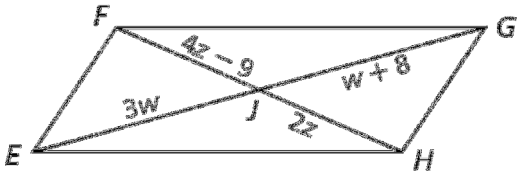
Find *DF*.

***2. WXYZ* is a parallelogram.**
Find *YZ*.
Find m∠*Z*.

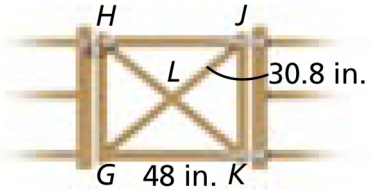


***3. EFGH* is a parallelogram.**
Find *FH*.

]



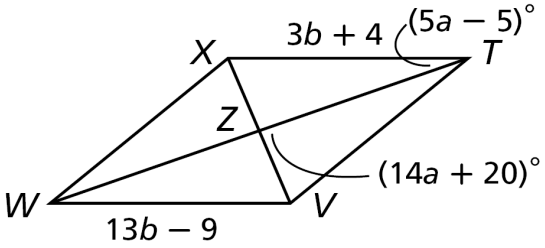
4. Carpentry The rectangular gate has diagonal braces.
Find *HJ*.
Find *HK*.



5. ***TVWX* is a rhombus.**
Find *TV*.

Find m∠*VZT*.

Find m∠*VTZ*.



Quadrilateral Properties HW

Answer each of the following questions.

1. If a property is true in a square, what other figure(s) must it be true in?

2. If a property is true in a rectangle, what other figure(s) must it be true in?

3. If a property is true in a rhombus, what other figure(s) must it be true in?

4. If a property is true in a parallelogram, what other figure(s) must it be true in?

5. If a figure is a rectangle, what else MUST it be?

6. If a figure is a parallelogram, what else MUST it be?

7. If a figure is a square, what else MUST it be?

8. If a figure is a rhombus, what else MUST it be?

Tell whether the following are true or false. If false, state or draw a counterexample.

9. A square is always a parallelogram.

10. A parallelogram is always a square.

11. A rectangle is always a rhombus.

12. A rhombus can never be a square.

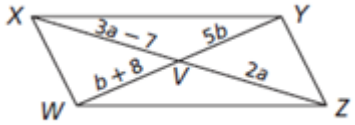
13. Every rectangle is also a square.

14. Every parallelogram is regular.

15. A rhombus is always irregular.

For each shape, finish the statements.

Parallelogram

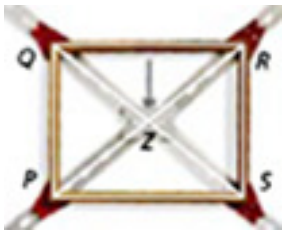


$\overline{XW} \cong$ ___ $\overline{XY} \cong$ ___ $\overline{XV} \cong$ ___ $\overline{WV} \cong$ ___

$XV + VZ =$ ___ $WY - WV =$ ___

$m\measuredangle WXY =$ ____ $m\measuredangle WXY + m\measuredangle XWZ =$ ____

Rectangle



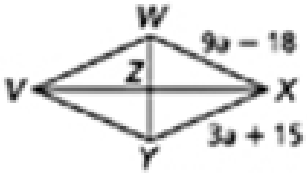
$\overline{RS} \cong$ ___ $\overline{SP} \cong$ ___ $\overline{QZ} \cong$ ___ $\overline{PR} \cong$ ___

$QZ + SZ =$ ___ $PR - ZR =$ ___ $m\measuredangle QZR =$ ____

$m\measuredangle PQR =$ ____ $m\measuredangle PQZ +$ _____ $= m\measuredangle PQR$

$\Delta QPS \cong$ ____ $\Delta QZR \cong$ ____

Rhombus



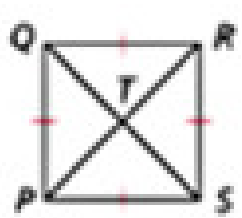
$\overline{XW} \cong$ ___ $\overline{XY} \cong$ ___ $\overline{XZ} \cong$ ___ $\overline{WZ} \cong$ ___

$XZ + VZ =$ ___ $WY -$ ____ $= WZ$ _____ $= 90°$

$m\measuredangle WXY =$ ____ $m\measuredangle WXY + m\measuredangle XWV =$ ____

$m\measuredangle VWZ =$ _____ $\Delta WZV \cong$ ____ $\Delta WVY \cong$ ____

Square



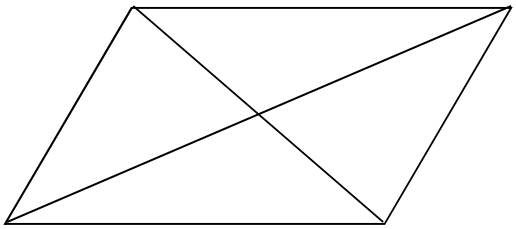
$\overline{QR} \cong$ ___ $\overline{QP} \cong$ ___ $\overline{QT} \cong$ ___ $\overline{QS} \cong$ ___

$QT +$ ____ $= QS$ $RP - TR =$ ___ _____ $= 90°$

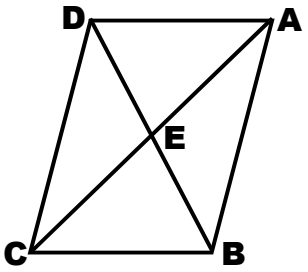
$m\measuredangle PQR =$ ____ $m\measuredangle QPT +$ ____ $= m\measuredangle QPS$

$m\measuredangle QRT =$ _____ $\Delta QTR \cong$ ____ $\Delta RQP \cong$ ____

USING QUADRILATERAL PROPERTIES

Properties of a parallelogram:	
1. Opposite sides are parallel.	
2. Opposite sides are congruent.	
3. Opposite angles are congruent.	
4. Consecutive angles are supplementary.	
5. Diagonals bisect each other.	

EXAMPLE 1
Complete each statement regarding the parallelogram below.



a) Name the parallelogram:_____

b) $\overline{AB} \parallel$ _____

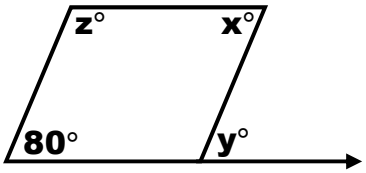
c) DA ≅ _____

d) ∠CDA ≅ _____

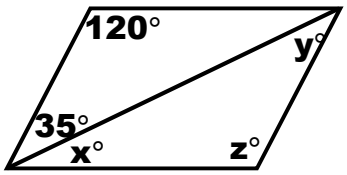
e) $\overline{DE}$ ≅ _____

EXAMPLES
For each parallelogram, find the values of 'x', 'y', and 'z'.

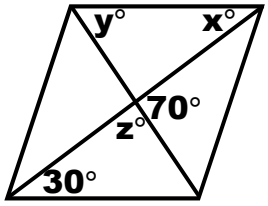
2.



3.



4.



x = _____; y = _____;

z = _____

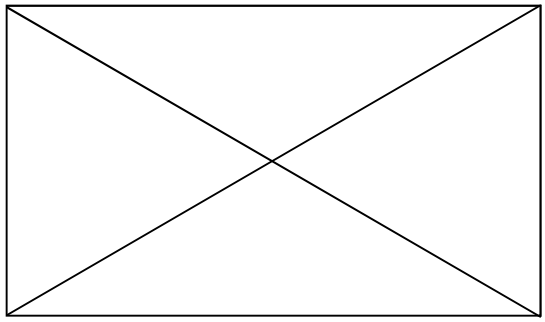
x = _____; y = _____;

z = _____

x = _____; y = _____;

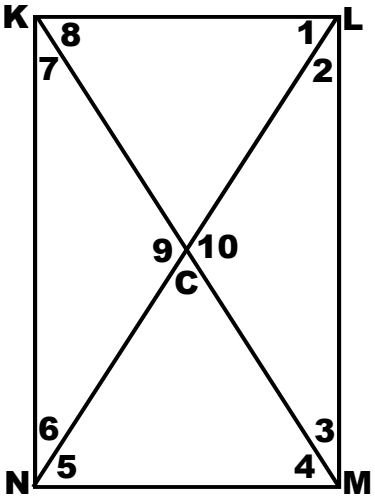
z = _____

Properties of a rectangle:
1. Opposite sides are parallel.
2. Opposite sides congruent.
3. Opposite angles congruent.
4. Consecutive angles supplementary.
5. Diagonals bisect each other.
6. Four right angles.
7. Diagonals are congruent.



EXAMPLE 5

Use the rectangle KLMN and the given information to find the following.



m∠1 = 70° m∠6 = _____

m∠2 = _____ m∠7 = 20°

m∠3 = _____ m∠8 = _____

m∠4 = _____ m∠9 = _____

m∠5 = _____ m∠10 = _____

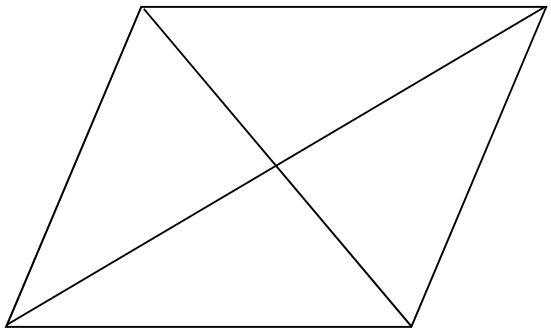
CN = 15 KL = 16

CM = _____ KM = _____

CL = _____ KN = _____

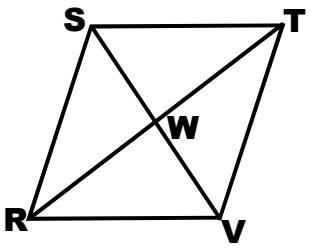
CK = _____ NM = _____

NL = _____ LM = _____

Properties of a rhombus:	
1. Opposite sides parallel.	
2. Opposite sides congruent.	
3. Opposite angles congruent.	
4. Consecutive angles supplementary.	
5. Diagonals bisect each other.	
6. Four congruent sides.	
7. Diagonals are perpendicular.	
8. Diagonals bisect opposite angles.	

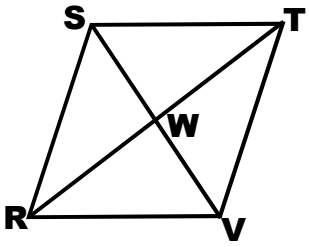
EXAMPLE 6

Given Rhombus RSTV, if m∠RST = 67°, find m∠RSW.



EXAMPLE 7

Given Rhombus RSTV, find m∠SVT if m∠STV = 135°.



EXAMPLE 8

In rhombus DLMP, DM = 24, m∠LDO = 43°, and DL = 13. Find each of the following.

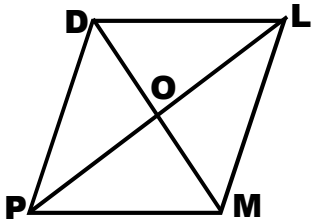
a) OM = _____

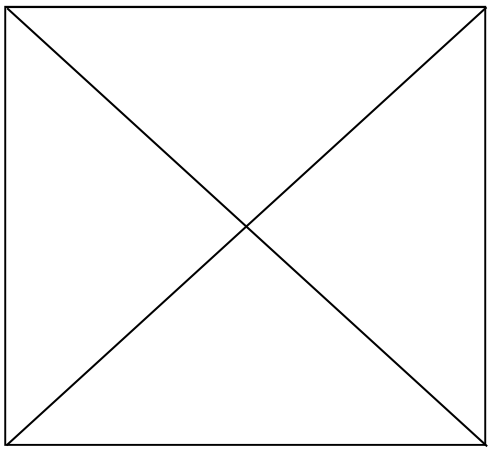
b) m∠DOL = _____

c) m∠DLO = _____

d) m∠DML = _____

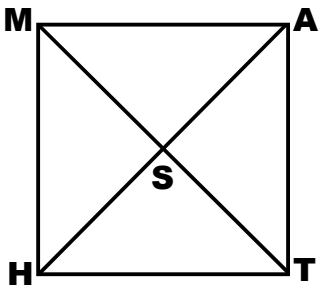
e) DP = _____



Properties of a square:	
1. Opposite sides parallel.	
2. Opposite sides congruent.	
3. Opposite angles congruent.	
4. Consecutive angles supplementary.	
5. Diagonals bisect each other.	
6. Four right angles.	
7. Diagonals congruent.	
8. Four congruent sides.	
9. Diagonals are perpendicular.	
10. Diagonals bisect opposite angles.	

EXAMPLE 9

MATH is a square.



a) If MA = 8, then AT = _____

b) m∠HST = _____

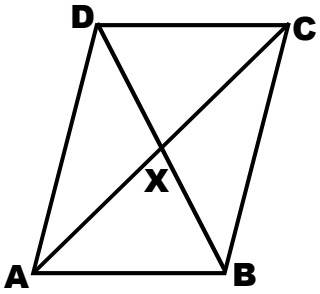
c) m∠MAT = _____

d) If HS = 2, then HA = _____ and MT = _____

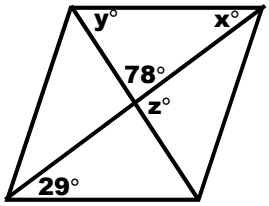
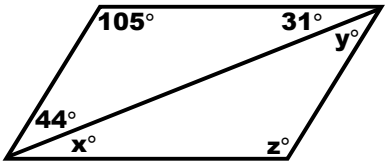
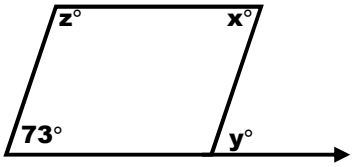
e) m∠HMT = _____

USING THE PARALLELOGRAM PROPERTIES ASSIGNMENT

1. Name the parallelogram:_____
2. If AD = 10, then BC = _____
3. If AC = 15, then AX = _____
4. If m∠CDA = 111°, then m∠ABC = _____
5. If m∠DAB = 69°, then m∠ABC = _____

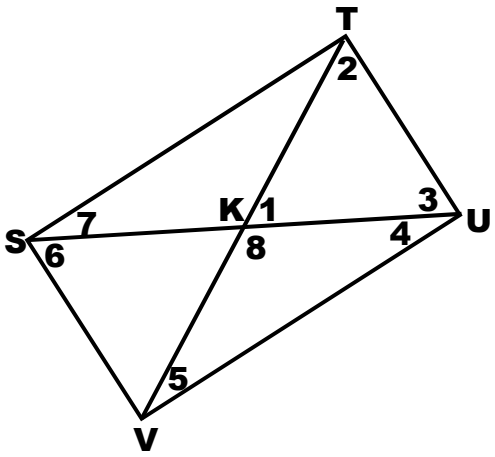


If each quadrilateral is a parallelogram, find the values of 'x', 'y', and 'z'.

6. x = _____ y = _____ z = _____ 	7. x = _____ y = _____ z = _____ 	8. x = _____ y = _____ z = _____ 

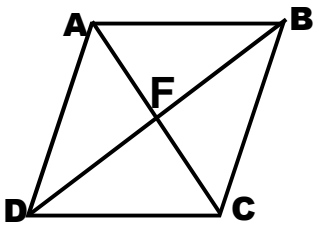
Use rectangle STUV and the given information to find each measure.

9. m∠3=_____	If m∠4 = 30°, find m∠3.
10. m∠4=_____	m∠6 = 57°, what is m∠4?
11. m∠2=_____	If m∠5 = 16°, what is m∠2.
12. KT =_____	If SK = 15, find KT.
13. SV =_____	If SU = 15 and ST = 12, find SV.
14. TU =_____	If KV = 5 and ST = 8, find TU.



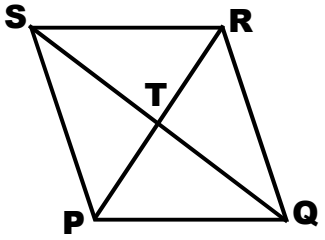
Use rhombus ABCD and the given information to find each value.

15. m∠ACD= _____	If m∠BAF = 28°, find m∠ACD.
16. m∠ABC = _____	If m∠ACD = 34°, find m∠ABC.



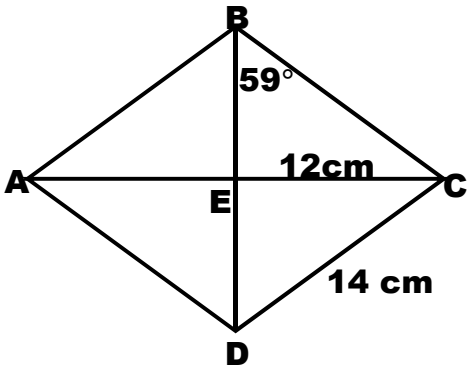
Use rhombus PQRS and the given information to find each value.

17. SQ = _____	If ST = 13, find SQ.
18. m∠QRS = _____	If m∠PRS = 17°, find m∠QRS.
19. m∠STR = _____	Find m∠STR.



Use the rhombus ABCD and the given information to find each measure.

20. _____	Find m∠BEC.
21. _____	Find m∠BCE.
22. _____	Find AC.
23. _____	Find m∠ABD.
24. _____	Find AD.



25. Which of the following statements describes properties and characteristics of squares?

I. Consecutive angles are supplementary.

II. Diagonals are perpendicular bisectors and angle bisectors.

III. It is the only regular quadrilateral.

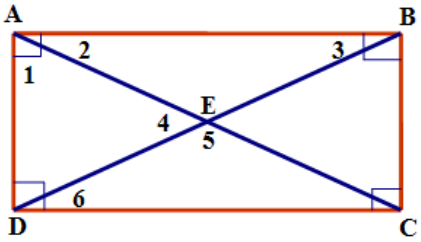
IV. Four right isosceles triangles form from the intersection of the diagonals.

A All of the above statements are true.
B II, III, and IV only
C I, III, IV only
D I, II, and III only
E I, II, and IV only

26. Which choice must be true about parallelograms?

A The diagonals are congruent.
B Two pairs of sides are parallel.
C The diagonals are perpendicular bisectors.
D The diagonals are angle bisectors.
E All quadrilaterals are parallelograms.

27. The figure below is rectangle *ABCD* with point *E* as the intersection of diagonals *AC* and *DB*.



28. Which of the following procedures can be used to find $m\angle AEB$?

A Find the complement of $\angle 1$, multiply the result by 2, and then subtract from 180.
B Find the supplement of $\angle 5$, divide by 2, and then subtract the result from 180.
C Add $\angle 1$, $\angle 3$, and $\angle 4$ together. Then subtract the result from 180.
D Add $\angle 2$, $\angle 3$, and $\angle 5$ together. Then subtract the result from 180.

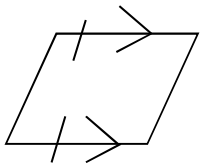
29. In rhombus $ABCD$, $m\angle DCB$ is 120°. What is $m\angle ABD$?

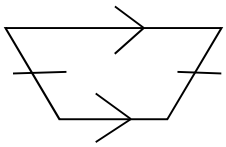
A 20° **B** 30° **C** 60° **D** 120°

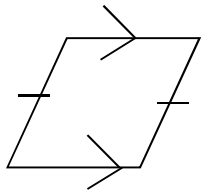
30. Choose the best counterexample for the conditional statement below:

"If a quadrilateral has a pair of parallel sides and a pair of congruent sides, then the quadrilateral is a parallelogram."

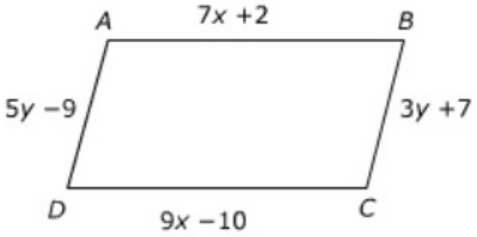
A

B 

C 

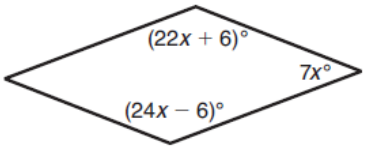
D 

31. The figure shows Rectangle $ABCD$.
What is the length of $\overline{AD}$ and $\overline{DC}$?

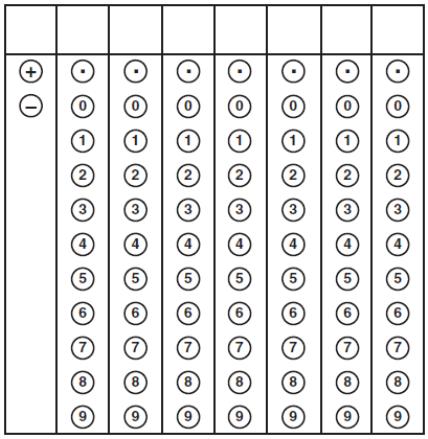


A $\overline{AD} = 31$ and $\overline{DC} = 44$
B $\overline{AD} = 8$ and $\overline{DC} = 6$
C $\overline{AD} = 10$ and $\overline{DC} = 26$
D $\overline{AD} = 30$ and $\overline{DC} = 10$

33. The figure below shows interior angles of a quadrilateral. Find the value of x that would make the figure a parallelogram.



Record your answer in the grid provided.

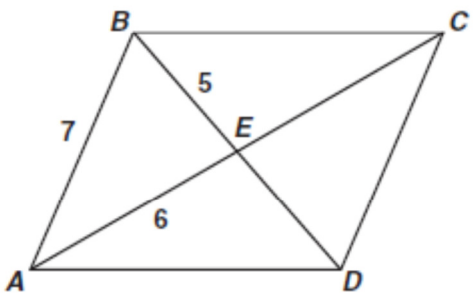


34.

Parallelogram $ABCD$ has coordinates $A(1,5)$, $B(6,3)$, $C(3,-1)$, and $D(-2,1)$. What are the coordinates of E, the intersection of diagonals $\overline{AC}$ and $\overline{BD}$?

(1) (2,2) (3) (3.5,2)
(2) (4.5,1) (4) (−1,3)

35. **If *ABCD* is a parallelogram, what is the length of segment *BD*?**



A 10

B 11

C 12

D 14

36.

Which figure can serve as a counterexample to the conjecture below?

If one pair of opposite sides of a quadrilateral is parallel, then the quadrilateral is a parallelogram.

A rectangle

B rhombus

C square

D trapezoid

37. **Quadrilateral *ABCD* is a parallelogram. If adjacent angles are congruent, which statement must be true?**

A Quadrilateral *ABCD* is a square.

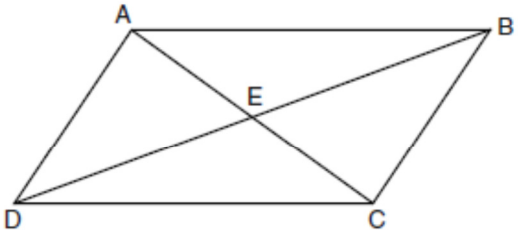
B Quadrilateral *ABCD* is a rhombus.

C Quadrilateral *ABCD* is a rectangle.

D Quadrilateral *ABCD* is an isosceles trapezoid.

38.

In parallelogram *ABCD* shown below, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at *E*.



Which statement must be true?

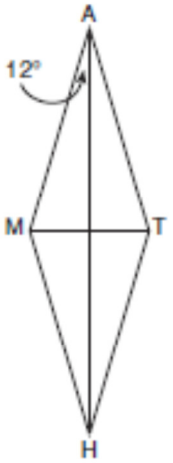
(1) $\overline{AC} \cong \overline{DB}$

(2) $\angle ABD \cong \angle CBD$

(3) $\triangle AED \cong \triangle CEB$

(4) $\triangle DCE \cong \triangle BCE$

39. In the diagram below, *MATH* is a rhombus with diagonals $\overline{AH}$ and $\overline{MT}$.



If $m\angle HAM = 12$, what is $m\angle AMT$?

(1) 12

(2) 78

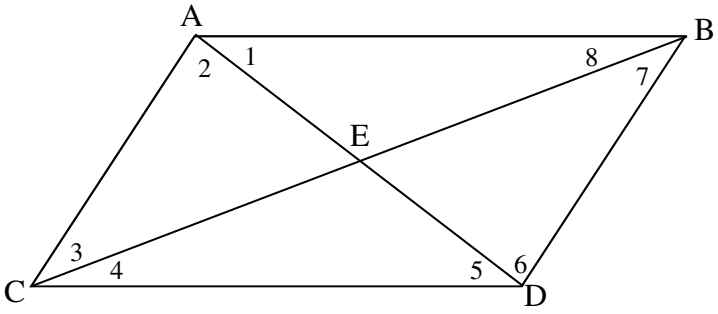
(3) 84

(4) 156

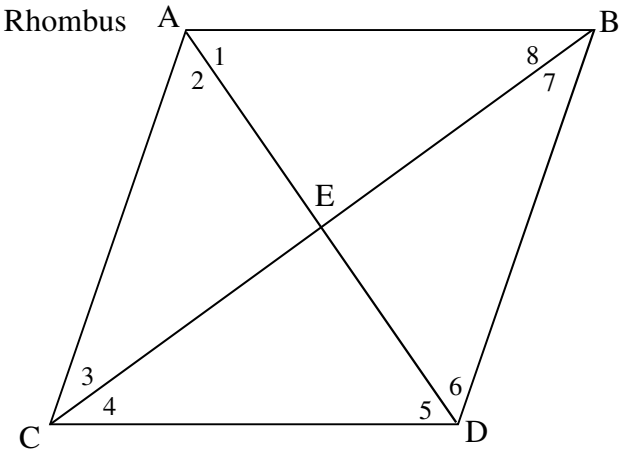
Which Parallelogram Am I?

A $\measuredangle 7 \cong \measuredangle 8 \cong \measuredangle 6$	**B** $\overline{BE} \cong \overline{AE}$
C $\Delta BEC \cong \Delta DEA$	**D** $m\measuredangle 7 = m\measuredangle 8$
E $\overline{AB} \parallel \overline{CD}$; $\overline{AB} \perp \overline{BC}$	**F** $\measuredangle ABE$ *and* $\measuredangle CBE$ are complementary $\measuredangle ABC$ *and* $\measuredangle BEC$ are supplementary
G $m\measuredangle 7 = m\measuredangle 4$	**H** $m\measuredangle E = 90°$
I ΔAED is an isosceles right triangle.	**J** If $\overline{AE} = 9$, then $\overline{DE} = 9$
K E is the midpoint of $\overline{BD}$ and $\overline{AC}$	**L** $\measuredangle 7 \cong \measuredangle 3$; $\measuredangle 1 \cong \measuredangle 5$

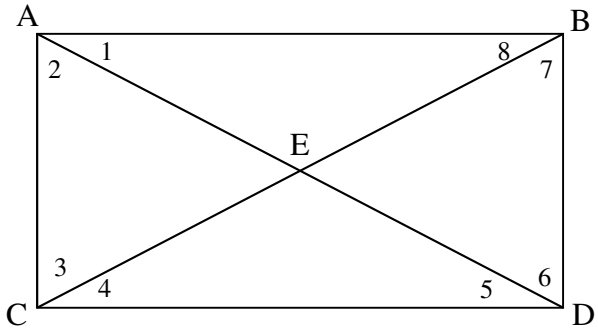
Parallelogram



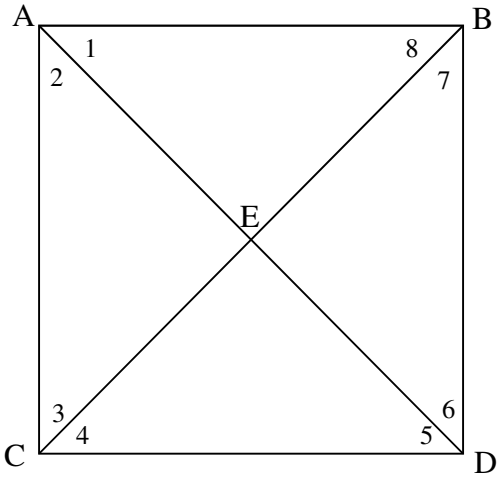
Rhombus



Rectangle



Square



QUADRILATERALS ON THE COORDINATE PLANE

We use _____ of parallelograms to _____ if it is a square, rectangle, and /or rhombus.

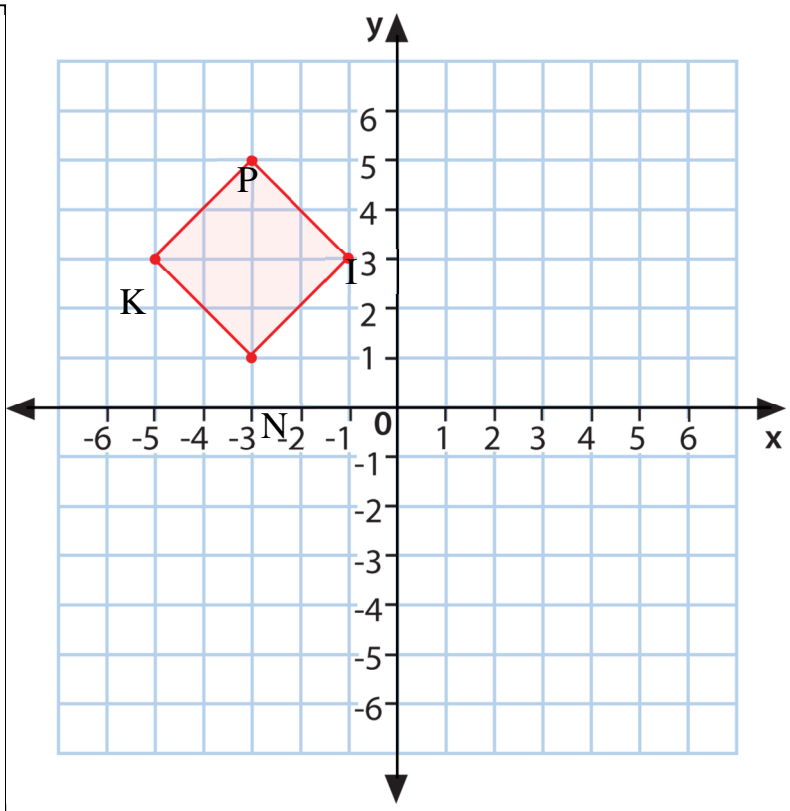
Example:

* I know a square must have 4 equal sides and all 4 angles are perpendicular.
*I need to find the length of PI, IN, NK, and KP.
*I need to compare the slopes of PI and IN to see if they are perpendicular (negative reciprocals).

Show work:

Distance formula/PT –

Slopes –



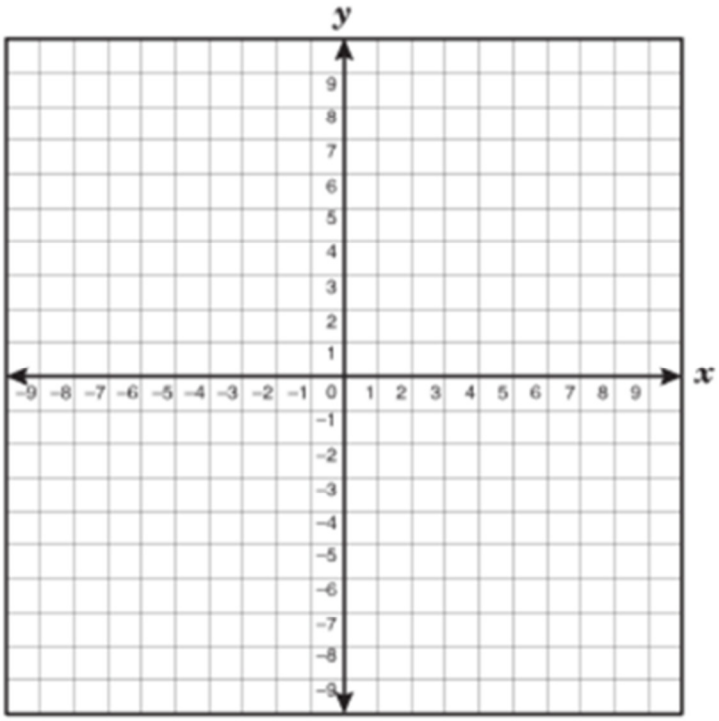
Rectangle: (draw and label first)

A. Sides-

B. Angles-

C. Diagonals-

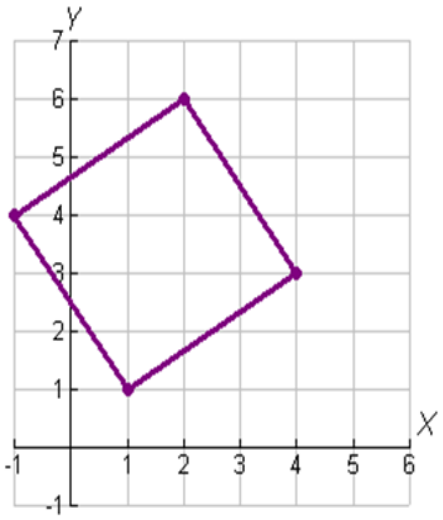
Show work:



Use the diagonals to determine whether a parallelogram with the given vertices is a rectangle rhombus, or square. Give all the names that apply.

Example

P(-1, 4), Q (2, 6), R(4, 3), S(1, 1)



Step 1- Graph ▱PQRS.

Step 2- Find PR and QS to determine if PQRS is a rectangle.

PQ =
RS =

The diagonals are _____, therefore *PQRS* is a _____.

Step 3- Determine if ▱PQRS is a rhombus.

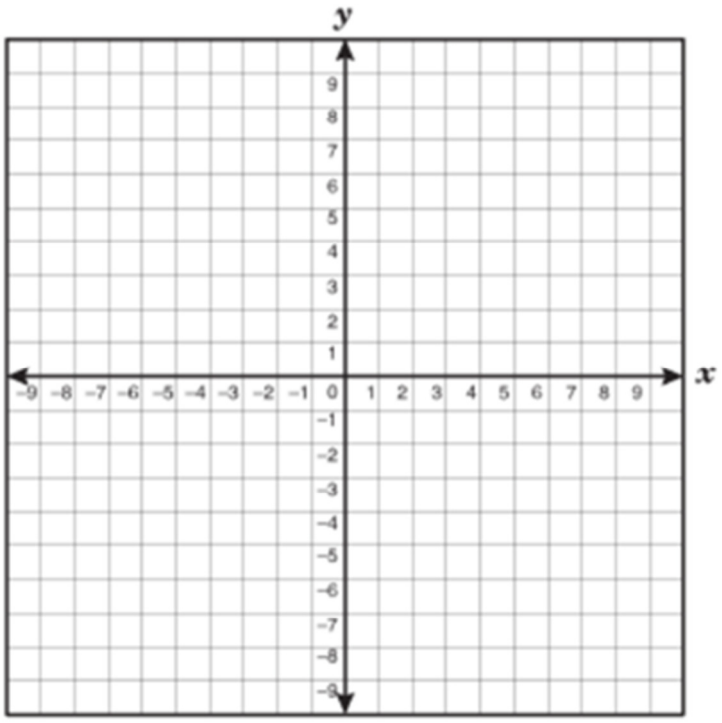
Slope of PR =
Slope of QS =

Since _____, _____, ▱PQRS is a rhombus.

Step 4- Determine if ▱PQRS is a square.

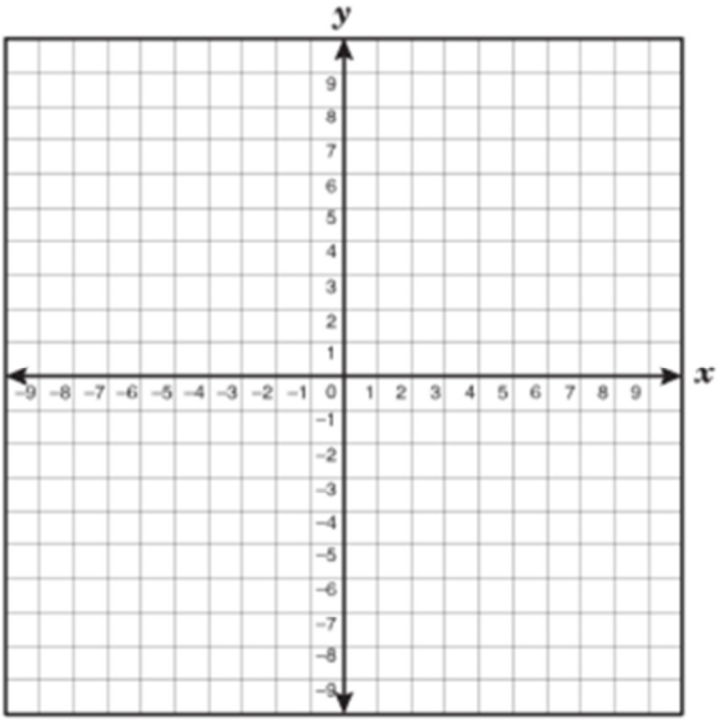
Since ▱PQRS is a _____ and a _____, it has four _____ angles and four _____ sides. So ▱PQRS is a square by _____.

YOUR TURN!!! WHOO HOO!!!
***W*(0, 1), *X*(4, 2), *Y*(3, –2), *Z*(–1, –3)**

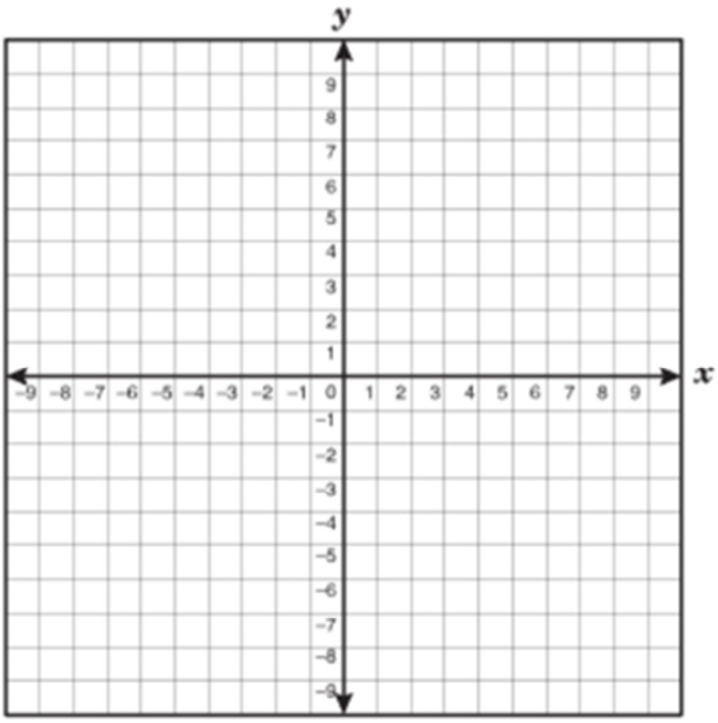


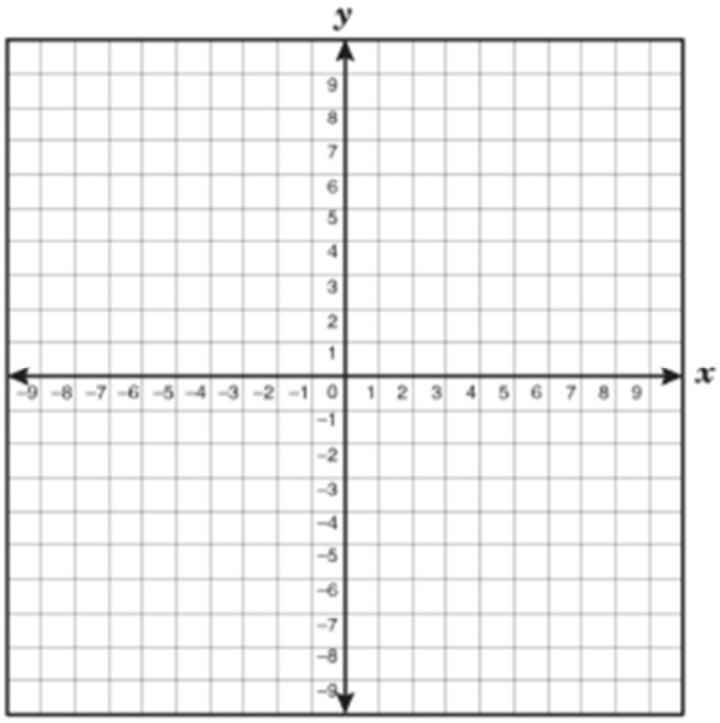
Quadrilaterals on a Coordinate Plane Assignment

1. Show that ABCD is a parallelogram using the following points: A(-3, 2), B(-2, 7), C(2, 4), and D(1, -1).



2. Show that FGHJ is a parallelogram using the following points: (F(-4, -2), G(-2, 2), H(4, 3), and J(2, -1).

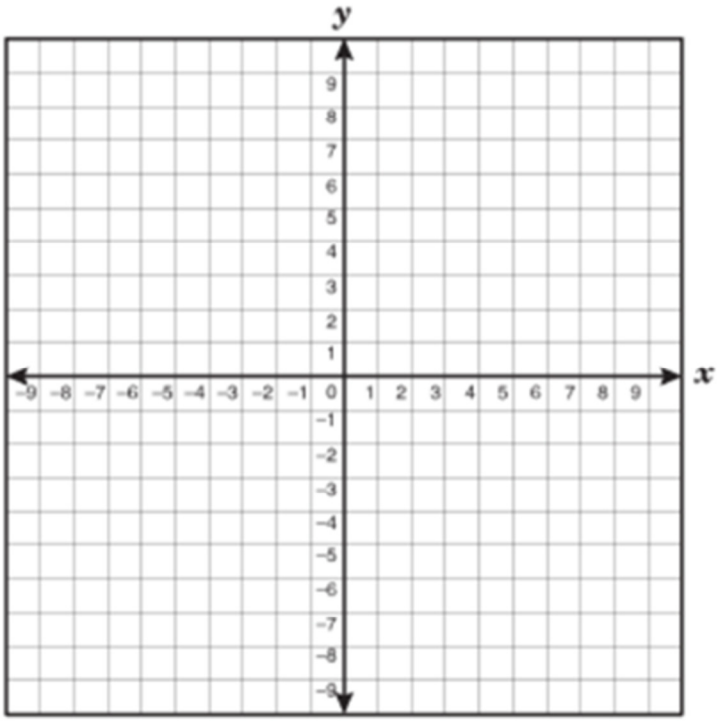




3. Rachel graphs a parallelogram with the coordinates A(5,4), B(5, 10), C(9, 8), D(9, 2). What is the coordinates of the point where the diagonals meet?

4. Use the diagonals to determine whether a parallelogram with the given vertices is a rectangle, rhombus, or square. Give all the names that apply.

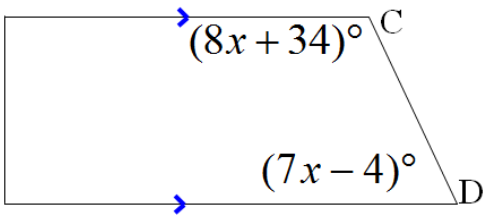
P(-5, 2), Q(4, 5), R(6, -1), S(-3, -3)



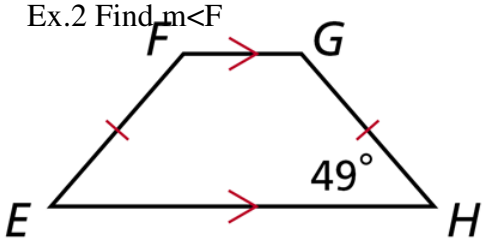
Trapezoid and Kite Examples

Trapezoid

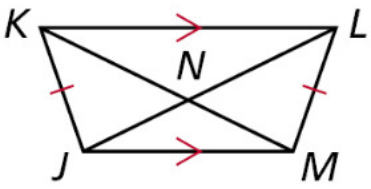
Ex. 1 Find m<C



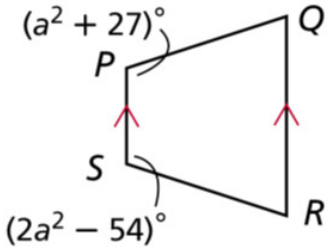
Ex.2 Find m<F



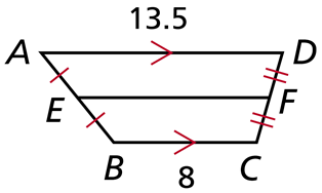
Ex. 3 *JN* = 10. 6, and *NL* = 14.8. Find *KM*.



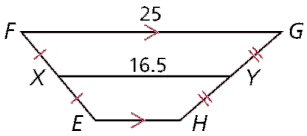
Ex. 4 Find the value of *a* so that *PQRS* is isosceles.



Ex. 5 Find EF

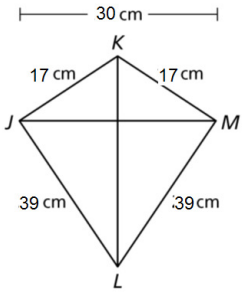


Ex 6. Find EH

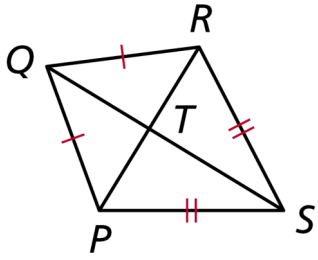


Kites

Ex. 1 Find KL

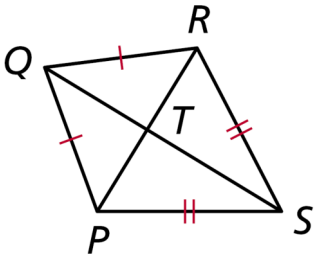


Ex. 2 In kite *PQRS*, m∠*PQR* = 78°, and m∠*TRS* = 59°. Find m∠*QPS*.



Trapezoid and Kites Assignment

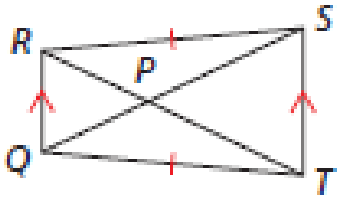
I. For each shape finish the statements.



$\overline{QR} \cong$ ___ $\overline{PS} \cong$ ___ $\overline{PT} \cong$ ___ $\Delta QRT \cong$ ___

$\Delta PTS \cong$ ___ $QT + TS =$ ___ $2(TR) =$ ___

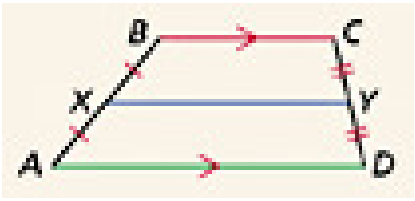
$m\measuredangle PQT =$ ____ $m\measuredangle STP + m\measuredangle RTQ =$ ____



$\overline{QT} \cong$ ___ $\overline{QR} \parallel$ ___ $\overline{RT} \cong$ ___ $\measuredangle RPS \cong$ ___

$\measuredangle RQT \cong$ ___ $RT - PT =$ ___ $QP + PS =$ ___

$m\measuredangle QTS =$ ____ $m\measuredangle QRS + m\measuredangle RST =$ ____



$\overline{AX} \cong$ ___ $\overline{CD} \cong$ ___ $2(AX) =$ ____ $\frac{1}{2}(CD) =$ _____

$AX + BX =$ ___ $CD -$ ___ $= YD$ $\frac{1}{2}(BC + AD) =$ _____

$2($___$) = BC + AD$ $m\measuredangle BAX +$ _____ $= 180°$

II. Answer the following questions.

1. Draw the following and label the 2 bases: TRAP is an isosceles trapezoid with diagonals $\overline{RP}$ and $\overline{TA}$.

2. Draw the following quadrilateral: ABCD, $\overline{AB} \parallel \overline{CD}$, $\measuredangle A \cong \measuredangle B$, and $\overline{AB} \neq \overline{CD}$.

3. The measures of the bases of a trapezoid are 8 and 26. What is the measure of the midsegment of the trapezoid?

4. Which statement is never true for a kite?
   a. The diagonals are perpendicular
   b. One pair of opposite angles are congruent
   c. One pair of opposite sides are parallel
   d. Two pairs of consecutive sides are congruent.

III. Please answer the following questions as Always, Sometimes, or Never true

5. If a quadrilateral is a trapezoid then it is an isosceles trapezoid.
6. If a quadrilateral is an isosceles trapezoid then it is a trapezoid.
7. If the diagonals of a quadrilateral are perpendicular then it is a kite.
8. If a quadrilateral has exactly one pair of parallel sides, then it is a parallelogram.

IV. Mark the symbols on each figure to match the given definition.

9. Kites are quadrilaterals with perpendicular diagonals.

10. Kites are quadrilaterals with exactly one pair of congruent opposite angles.

11. Kites are quadrilaterals with exactly two pairs of congruent consecutive sides.

12. Trapezoids are quadrilaterals with exactly one pair of parallel sides.

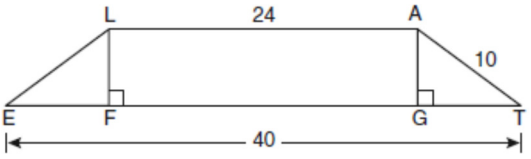
13. Isosceles trapezoids are trapezoids with congruent legs.

14. Isosceles trapezoids are trapezoids with two pairs of congruent base angles.

15. Isosceles trapezoids are trapezoids with congruent diagonals.

Trapezoid and Kites Assignment #2

1. In the diagram below, $LATE$ is an isosceles trapezoid with $\overline{LE} \cong \overline{AT}$, $LA = 24$, $ET = 40$, and $AT = 10$. Altitudes $\overline{LF}$ and $\overline{AG}$ are drawn.

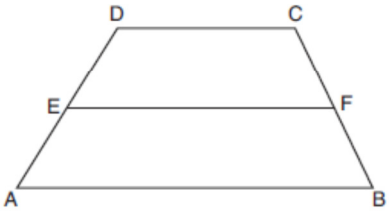


What is the length of $\overline{LF}$?

(1) 6 (3) 3

(2) 8 (4) 4

2. In the diagram below, $\overline{EF}$ is the median of trapezoid $ABCD$.

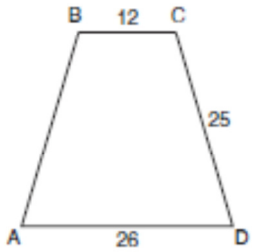


If $AB = 5x - 9$, $DC = x + 3$, and $EF = 2x + 2$, what is the value of x?

(1) 5 (3) 7

(2) 2 (4) 8

3. In the diagram below of isosceles trapezoid $ABCD$, $AB = CD = 25$, $AD = 26$, and $BC = 12$.



What is the length of an altitude of the trapezoid?

(1) 7 (3) 19

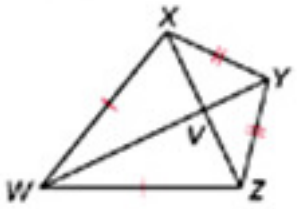
(2) 14 (4) 24

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

4. $m\angle VZY$

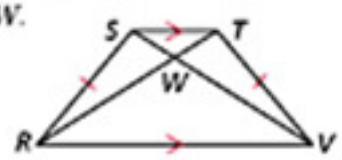
5. $m\angle VXW$

6. $m\angle XWZ$

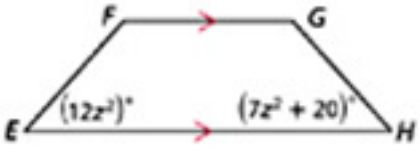


7. Find $m\angle A$.

8. $RW = 17.7$, and $SV = 23.3$. Find TW.



9. Find the value of z so that $EFGH$ is isosceles.

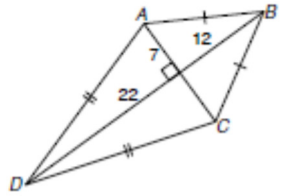


10. $MQ = 7y - 6$, and $LP = 4y + 11$. Find the value of y so that $LMPQ$ is isosceles.

11. Find QR.

12. Find AZ.

13. Find AD, AB, and the perimeter of the kite.

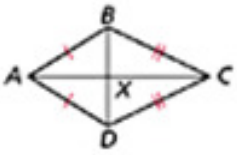


In kite $ABCD$, $m\angle DAX = 32°$, and $m\angle XDC = 64°$. Find each measure.

14. $m\angle XDA$

15. $m\angle ABC$

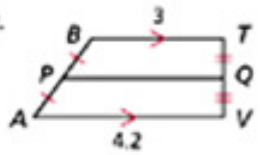
16. $m\angle BCD$



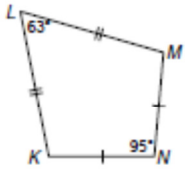
17. Find $m\angle Q$.

18. $SZ = 62.6$, and $KZ = 34$. Find RJ.

19. Find PQ.



20. In kite $KLMN$, find the measure of $\angle M$.

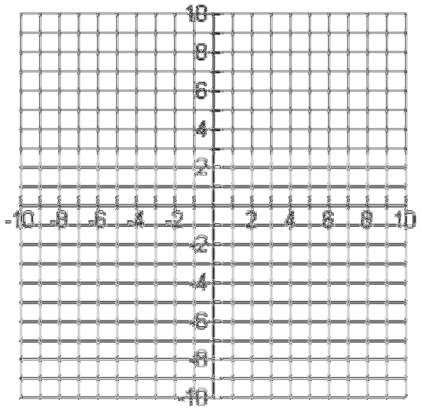


F 100.5°
G 101°
H 122°
J 130°

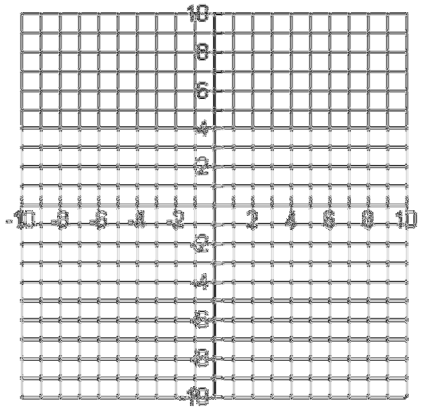
21. Find KR.

Give the best name for the quadrilateral with the given verticies. Justify using slopes and/or distance.

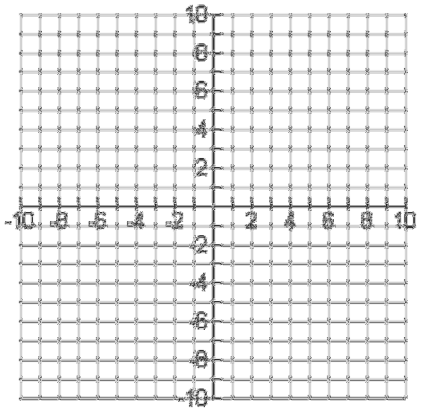
22. (-4, -1), (-4, 6), (2, 6), (2, -4)



23. (-4, -3), (0, 3), (4. 3), (8, -3)



24. (-5, 2), (-5, 6), (-1, 6), (2, -1)



Unit 9 Review

1. Circle which the properties that are common to the rectangle, rhombus, and square

Equiangular	Diagonals bisect the angles	Diagonals are perpendicular to each other
Regular	Diagonals bisect each other	
Convex	Opposite Angles Congruent	Consecutive Angles
Equilateral	Opposite Sides Congruent	Supplementary

2. Complete the following

Number of Sides	Number of Diagongonals
Triangle	
Quadrilateral	
Pentagon	
Hexagon	

How many diagonals would you have with a 17 a gon? _____

What is the pattern used? _____

3. A(12,0) B(4,0) C(8,5) D(4,10) . ABCD form a parallelogram. What is the coordinate of of where the diagonals meet?

4. List the properties of the parallelogram

_____ _____

_____ _____

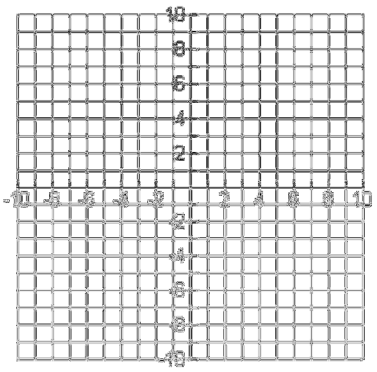
5. List the properties of the Isosceles Trapezoid

_____ _____

_____ _____

6. Amber draws a quadrilateral that has perpendicular bisectors. Name all the different types of quadrilaterals that she could of drawn. _____

7. ABCD is a rhombus. A(-3,5) B(2,7) C(4,2) D(-1,0). What is its perimeter?



8. In Rhombus ABCD, in the problem above(#7), what is the equation of diagonal AC?

9. Name the different ways you can prove a quadrilateral is a parallelogram.

10. Two interior angles of an octagon are 126° and 146°. The other six angles are congruent. Which equation could be used to find the measure of the six congruent angles.

A. 126 + 146 + x = 1080

B. 126 + 146 + 8x = 1440

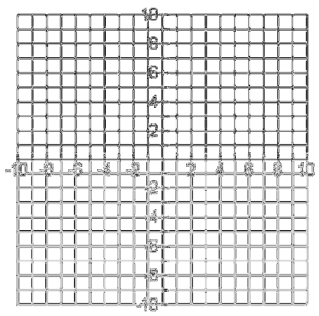
C. 126 + 146 + 6x = 1080

D. 126 + 146 = 1440 – 6x

11. Given Isosceles Trapezoid PQRM with the coordinates (-4,-3) (0,3) (4,3) and (8, -3), What is the slope of the midsegment?

12. Tell whether each statement is sometimes, always, or never true.

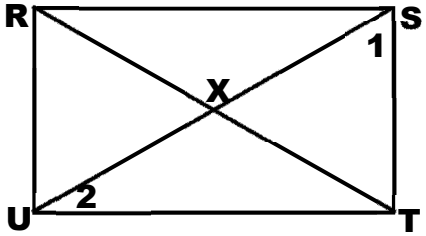
a. A rectangle is a parallelogram_____
b. A parallelogram is a rhombus _____
c. A square is a rhombus _____
d. A square is a rectangle _____
e. A rhombus is a square _____
f. A rhombus is a rectangle _____
g. A rectangle is a quadrilateral _____
h. A rectangle is a square _____



13) Make sure you know all the properties of the various quadrilaterals we have studied.

14) Give the best classification for the following figure (-5,2) (-5,6) (-1,6) (2,1)

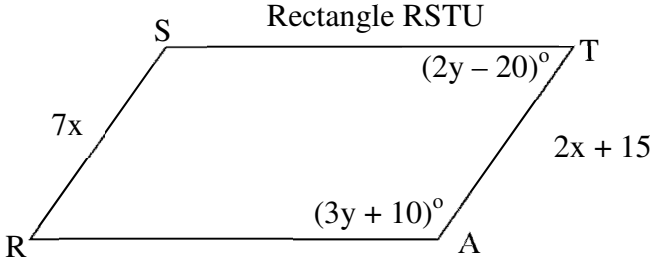
Use for #15 and 16



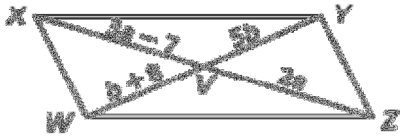
15)f m∠1 = 54°, find m∠2.

16) If XT = 2y – 3 and US = 32, find the value of 'y'.

Rectangle RSTU



17) Find x
18) Find y
19) TA =
20) Measure of angle A =

WXYZ is a parallelogram. Find each measure.

21. WV
22. YW
23. XZ
24. ZV