Geometry A

Unit 4: Quadrilaterals

Lesson 4- 4: Rectangles, Rhombus and Squares: algebra applications

Objectives:

- Students will be able to recall rectangle, rhombus and square properties.
- Students will be able to apply all the p-grams' properties to algebraic problem solving.

Vocabulary:

- Consecutive sides
- Consecutive angles
- Supplementary angles
- Diagonals bisect angles (angle bisector)
- Perpendicular

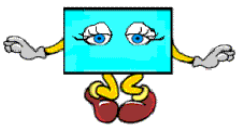
Game Plan:

Do Now
HW discussion
Whiteboard Power point: reinforce rectangle, rhombus and square properties
Note organizer: apply properties to algebraic problems
Practice

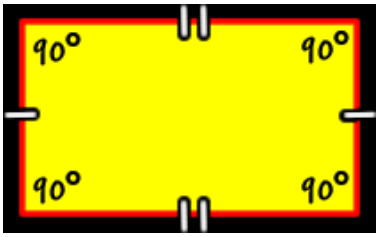
Focus Questions:

1. What are the special properties of a rectangle?
2. What are the special properties of a rhombus?
3. What are the special properties of a square?
4. Can you apply these properties to solve algebraic problems?

Homework: 4- 4 on CASTLE LEARNING



Rectangles:

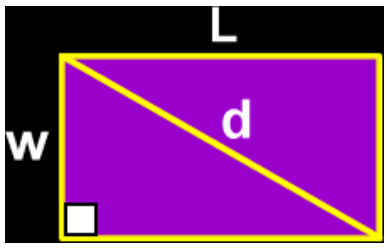


The sides and angles of a rectangle

Opposite sides of a rectangle are _____.

The angles of a rectangle are all _____.
(Which makes them all congruent)

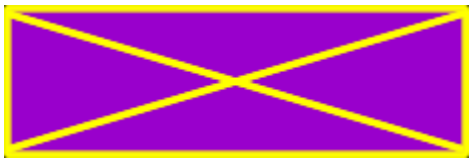
The diagonal of a rectangle:

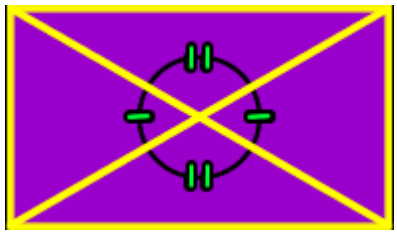


To find the length of the diagonal of a rectangle, use the Pythagorean Theorem:

Length of diagonal = d

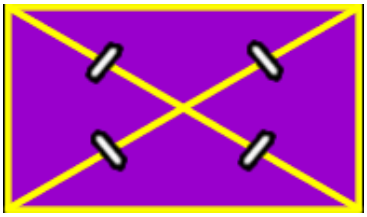
Properties of the diagonals of a rectangle:





Opposite central angles are equal measure because they are _____ angles (which are **congruent.**)

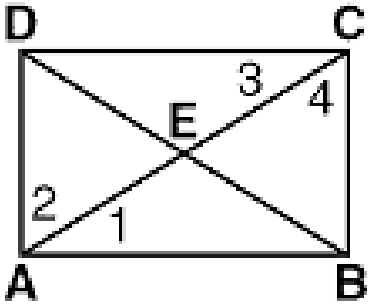
Diagonals are _____



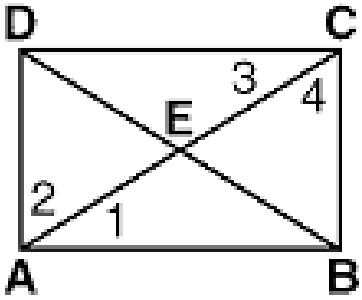
The pieces created when the diagonals intersect are congruent.

Rectangle Examples:

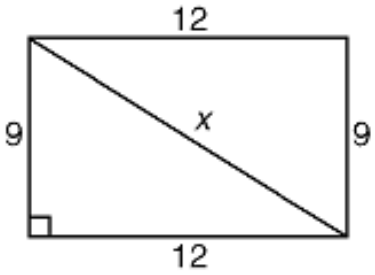
1] In the diagram below, ABCD is a rectangle with diagonals $\overline{AC}$ and $\overline{BD}$. If the $m\angle 2 = 58°$, find the measures of angles 1, 3, and 4.

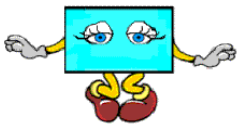


2] In the diagram below, ABCD is a rectangle with diagonals $\overline{AC}$ and $\overline{BD}$. If $AC = 6x + 2$ and $DB = 12x - 10$, find the value of x.



3] Use the information marked on the figure to find the value of x.

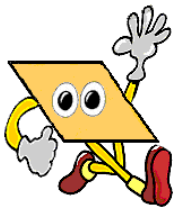




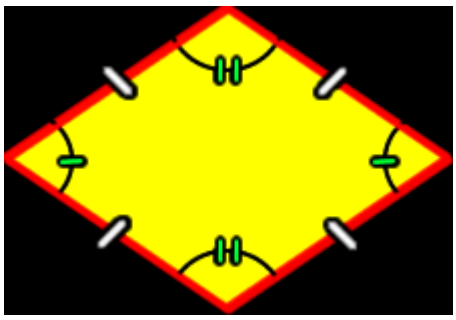
Think about it! [Draw a picture!]

4] In rectangle ABCD, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at point E. If $AE = 20$ and $BD = 2x + 30$, find x.

Rhombus:



The sides and angles of a rhombus:

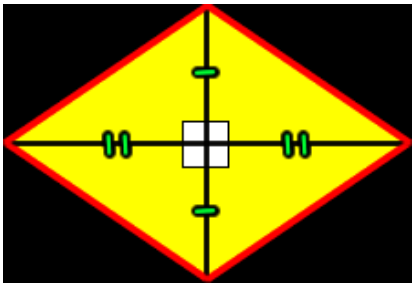


Opposite angles of a rhombus are _____

Consecutive angles of a rhombus are_____.

The sides of a rhombus are all _____.

Properties of the diagonals of a rhombus:



The intersection of the diagonals of a rhombus form _____ angles.

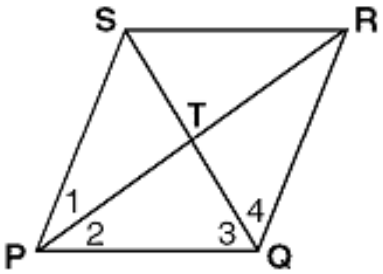
This means that they are _____.

The diagonals of a rhombus _____each other.

The diagonals of a rhombus are _____bisectors.

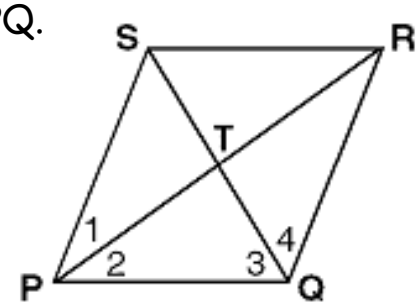
Rhombus Examples:

1] In the diagram below, PQRS is a rhombus with diagonals $\overline{PR}$ and $\overline{SQ}$.
If PQ= 3x + 8 and QR= 2x + 17, find the value of x.

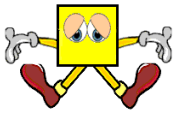


Rhombus Examples (continued):

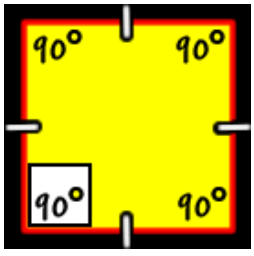
2] In the diagram below, PQRS is a rhombus with diagonals $\overline{PR}$ and $\overline{SQ}$.
If $\angle SPQ = 8x - 14$ and $m\angle 1 = 3x + 3$, then find $\angle SPQ$.



3] The diagonals of a rhombus have lengths of 12 centimeters and 16 centimeters. Find its perimeter.



Squares



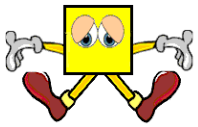
The sides and angles of a square:

The sides of a square are all _____.

The angles of a square are all _____ and are _____ angles.

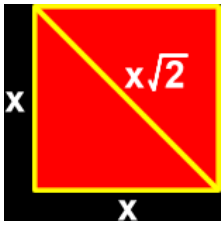
Opposite angles of a square are _____.

Squares



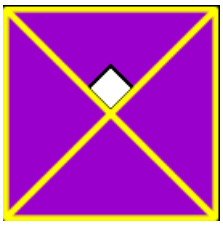
The diagonal of a square:

What type of special right triangle is formed by drawing a diagonal of a square?



So, If the length of one side is x, find the length of diagonal = _____.

The central angle of a square:



This means that the diagonals of a square are _____.

The diagonals of a square are _____.

The diagonals of a square are angle_____.

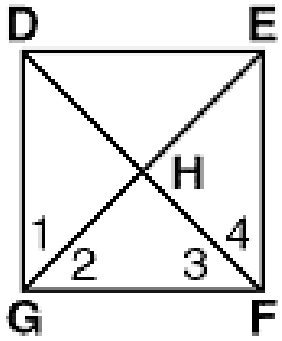
The diagonals of a square intersect in a _____degree angle.

Square Examples:

1) What is the length of the diagonal of a square whose side length is 12?

Square Examples (continued):

2] In the diagram below, DEFG is a square with diagonals $\overline{GE}$ and $\overline{DF}$.



a) If DE= 5x – 14 and EF= 3x – 6, find the value of x.

b) If DF= 2x – 17 and GE = 28 – 3x, find the value of x.

c) What is the measure of angle 4?_____

U-Try:

Read, Recall the property, Write an equation, Solve, Answer and Check it!

1) In rhombus PINK, PI = 3x +7 and IN = x +19, what is the value of NK?

2) In rectangle MATH, MT = 2x +12 and AH = 3x +2. What is the value of MT?

3) The diagonals of a rhombus are 16 and 30. Find the perimeter of the rhombus.

4) A rectangular garage, 27 feet by 36 feet, is being built. To ensure a right angle where the sides meet, what should each diagonal measure?

5) The diagonal of a square measures $7\sqrt{2}$, what is its perimeter?

SHADE IN YOUR ANSWERS. THEN USE THOSE LETTERS AND UNSCRAMBLE THEM TO ANSWER THE RIDDLE!

Answer Bank

A	L	M	Y	O	H	S	E	P	R
6	7	10	17	25	28	32	45	63	68

What always sleeps with its shoes on?

_____ _____ _____ _____ _____