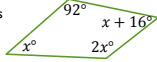## Thursday, November 29, 2012

Agenda:
- TISK Problems & 2 MM
- Lesson 6-4: Rhombi & Squares
- Homework: Chapter 6 Packet 2 #1-10

TISK Problems
1.) Solve for x.

$92°$ $x + 16°$
$x°$ $2x°$

2.) Simplify: $\frac{4x-18}{6} + \frac{1}{3}x$

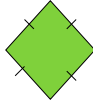3.) Find the slope of the line that passes through the points (5, -8) and (3, 9).

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§6.4 Rhombi & Squares

- Definitions
  - Rhombus
    - A parallelogram is a rhombus if and only if it has 4 congruent sides.

  - Square
    - A parallelogram is a square if and only if it has 4 congruent sides *and* 4 congruent (right) angles.

Example. Describing special parallelograms.

- Complete the sentence with *always*, *sometimes*, or *never*.
  1) A square is **always** a rectangle.
  2) A rectangle is **sometimes** a rhombus.
  3) A rhombus is **sometimes** a square.
  4) A square is **always** a rhombus.
  5) A rectangle is **sometimes** a square.
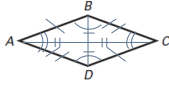 6) A rhombus is **sometimes** a rectangle.

Example. Using properties.

ABCD is a rhombus. What else do you know about ABCD?

ABCD has four congruent **sides** .
Def. Rhombus.

Its opposite sides are **congruent** .
If a quad. is a //ogram then opp. sides are congruent

Its opposite angles are **congruent** .
If a quad. is a //ogram then opp. angles are congruent

Its diagonals **bisect each other** .
If a quad. is a //ogram then diags. bisect each other.

Its consecutive angles are **supplementary** .
If a quad. is a //ogram then consec. angles are supplementary.

$m\angle A + m\angle B = 180°$
$m\angle A + m\angle D = 180°$
$m\angle B + m\angle C = 180°$
$m\angle C + m\angle D = 180°$

Corollary

- Square Corollary
  - A quadrilateral is a square if and only if it is both a rectangle and a rhombus.

Checkpoint Decide whether the statement is *always*, *sometimes*, or *never* true.

1. A rhombus is a square.	**2.** A parallelogram is a rectangle.

3. *QRST* is a square. What is the value of *x*?

Q R
$13 - 6x$
T $x + 27$ S
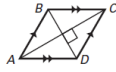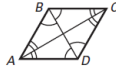
2

Theorems

A parallelogram is a rhombus if and only if its diagonals are **perpendicular**.

$ABCD$ is a rhombus if and only if $\overline{BD} \perp \overline{AC}$.

A parallelogram is a rhombus if and only if each diagonal bisects a pair of opposite angles.

$ABCD$ is a rhombus if and only if
$\overline{AC}$ bisects $\angle$ **BAD** and $\angle$ **BCD** and
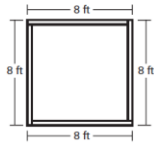$\overline{BD}$ bisects $\angle$ **ABC** and $\angle$ **ADC**.

Example. Checking a Square.

Tree House You are building a tree house.

a. To make the base of the floor, you nail four pieces of wood together as shown at the right. What is the shape of the floor base? Explain.

8 ft
8 ft   8 ft
8 ft

b. To make sure the base is a square, you measure the length of the diagonals. Both diagonals measure 11 feet 4 inches. Is the base a square? Explain.

a. All four sides are **congruent**. So, the floor base is a **rhombus**.

b. The diagonals are **congruent**. So, the floor base is a **rectangle**.

Because the base is a rhombus and a **rectangle**,

it is also a **square**.

Checkpoint Decide whether the statement is *true* or *false*. Explain your reasoning.

4. The diagonals of a rhombus are always congruent.

5. The diagonals of a square are never perpendicular.

6. Each diagonal of a rectangle sometimes bisects a pair of opposite angles.