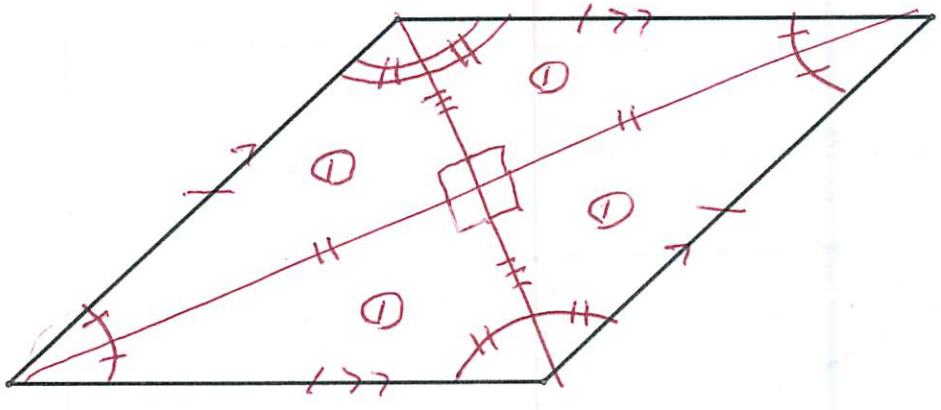
ANSWER KEY

Section 8-4

"Properties of Rhombuses, Rectangles and Squares"

Rhombus

"A quadrilateral with four congruent sides."



Key Properties:

1) 4 CONGRUENT SIDES

2) ALL 5 PROPERTIES OF A PARALLELOGRAM

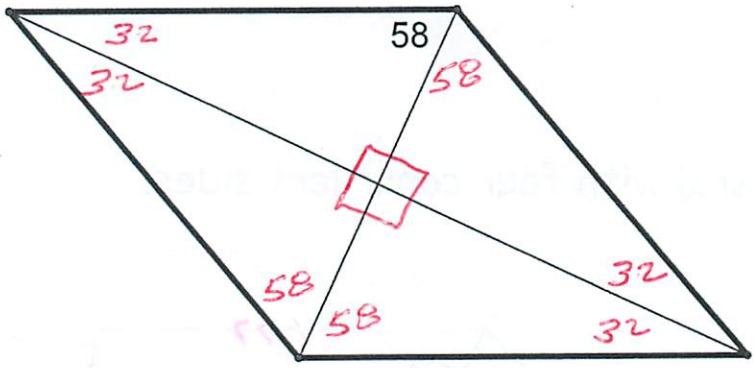
3) DIAGONALS ARE PERPENDICULAR TO EACH OTHER

4) DIAGONALS BISECT CORNER ANGLES

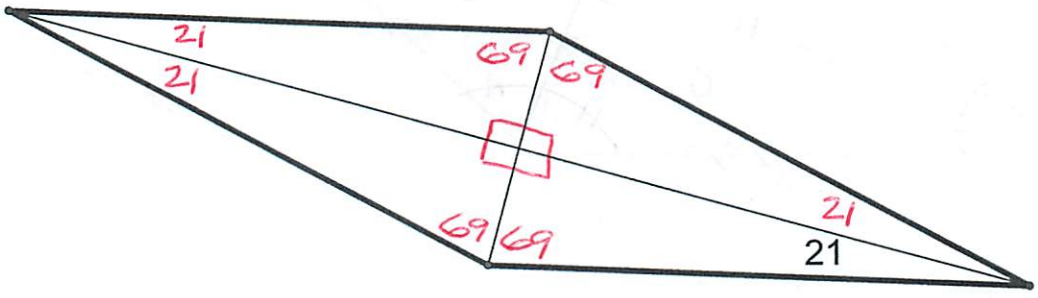
5) 4 INTERIOR ΔS ARE ALL CONGRUENT RIGHT ΔS

Geometry 3244
Rhombus Problems

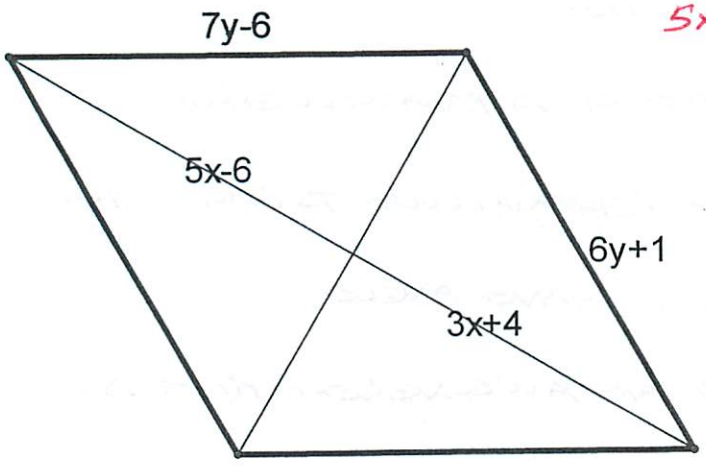
1) Fill in all of the interior angles for the following rhombus.



2) Fill in all of the interior angles for the following rhombus.



3) Solve for x and y.



$5x-6=3x+4$

$2x=10$ $\boxed{x=5}$

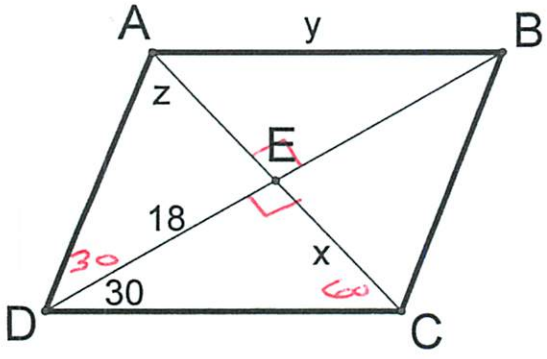
$7y-6=6y+1$

$\boxed{y=7}$

x = 5 y = 7

Example #1

Find the values for x, y and z for the following rhombus.



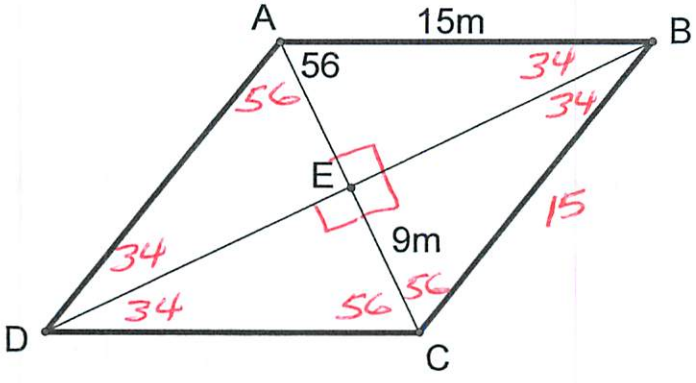
$x = 6\sqrt{3}$

$y = 12\sqrt{3}$

$z = 60$

Example #2

Find EB and fill in all of the missing interior angle measures.



$EB = \sqrt{15^2 - 9^2}$

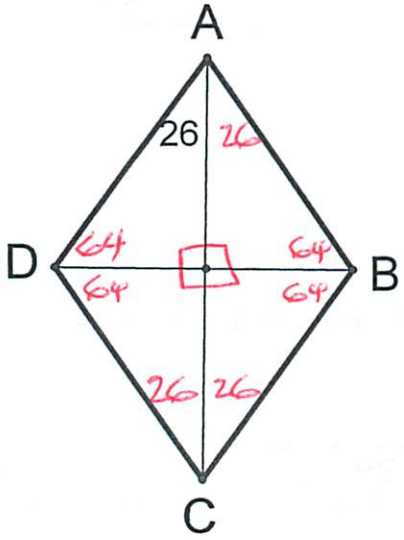
$EB = 12$

Geometry 3243/44
Section 6.4 Rhombus Problems

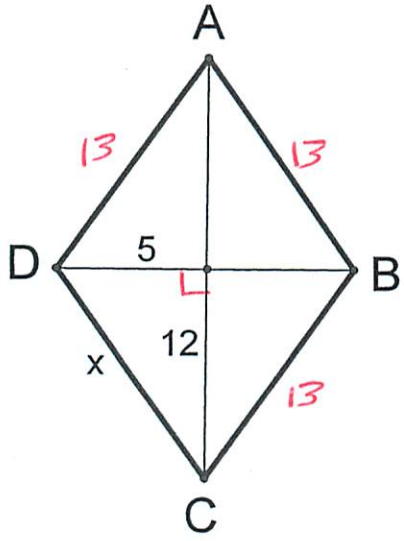
Name: _____ Date: _____

1. The following are all rhombus problems.

a) Fill in all of the missing interior angles.



b) Find "x" for the following rhombus and also find the perimeter.



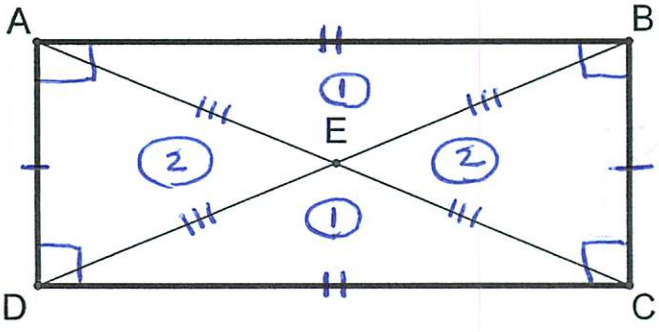
$x = \sqrt{5^2 + 12^2} = 13$

x = 13 perimeter = 52

Section 8.4
Properties of a Rectangle and a Square

Properties of a Rectangle

Definition: A QUADRILATERAL THAT HAS 4 RIGHT ANGLES



Key Properties:

1. HAS ALL 5 KEY PROPERTIES OF A PARALLELOGRAM

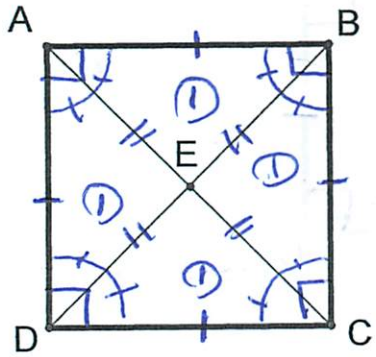
2. HAS 4 RIGHT ANGLES

3. DIAGONALS ARE CONGRUENT

4. OPPOSITE Δ's ARE CONGRUENT ISOC Δ's

Properties of a Square

Definition: A QUADRILATERAL THAT HAS 4 RIGHT ANGLES AND 4 CONGRUENT SIDES.



1. HAS 4 CONGRUENT SIDES

2. HAS 4 RIGHT ANGLES

3. ALL 5 KEY PROPERTIES OF A PARALLELOGRAM

4. DIAGONALS ARE CONGRUENT

5. DIAGONALS ARE PERPENDICULAR

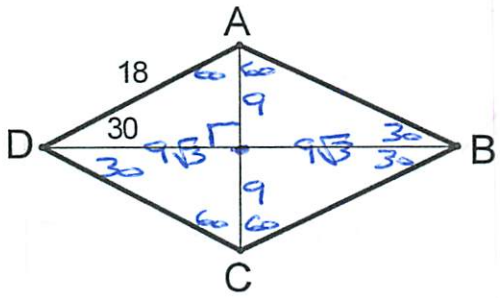
6. DIAGONALS BISECT OPPOSITE ANGLES

7. HAVE 4 CONGRUENT RIGHT TRIANGLES

Geometry 3242
Rectangle, Square and Rhombus Problems

Name: _____ Date: _____ Period: ____

1. Find AC and DB for the following rhombus. Also, find the area of the rhombus (break down into triangles and use A = 1/2bh). Also, fill in all of the interior angle measures. (SPECIAL RIGHT Δ's)

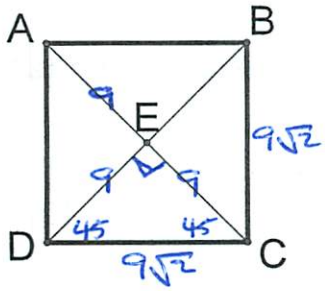


$A = \frac{1}{2}(18)(18\sqrt{3})$

$A = 9(18\sqrt{3})$

$A = 162\sqrt{3}$ UNITS^2

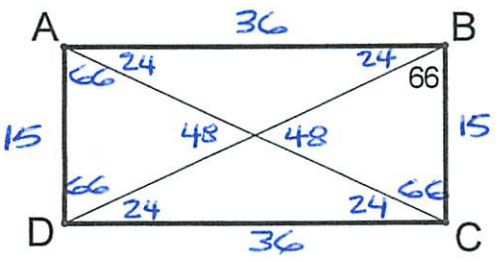
2. Find the perimeter and area of the following square given AE = 9 feet.

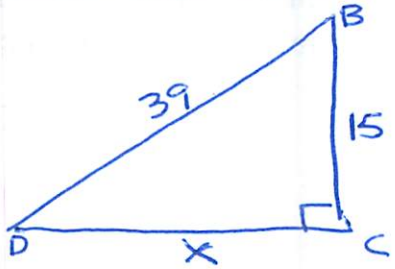


$A = (9\sqrt{2})(9\sqrt{2})$

$A = 162$ FT^2

3. Find the perimeter and area of the following rectangle given DB = 39 and BC = 15. Also, fill in all of the interior angle measures.





$X = \sqrt{39^2 - 15^2} = 36$

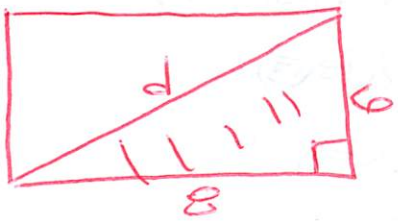
~~A~~ P = 102 UNITS

$A = (15)(36) = 540$ UNITS^2

Geometry 3244
Quadrilateral Word Problems using Pythagorean Theorem

Name: _____ Date: _____

1) A rectangle has an area of 48 in² and a length of 8 inches. Find the length of the diagonal of the rectangle (draw figure and show work).



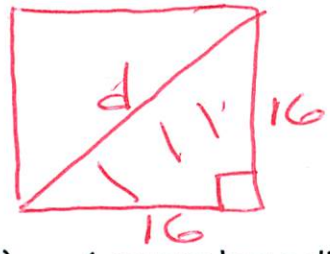
$A = lw$

$48 = 8w \quad w = 6$

$d = \sqrt{8^2+6^2} = 10$

d = 10 in

2) A square has a side length of 16 feet. Find the length of its diagonal.

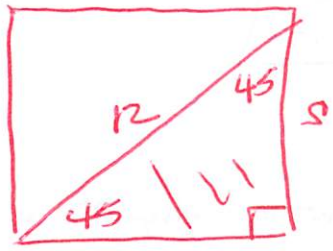


$d = \sqrt{16^2+16^2}$

$d = 22.6 \text{ ft}$

d = 22.6 ft or $16\sqrt{2}$ ft

3) A square has a diagonal that is 12 centimeters long. Find the length of its side.

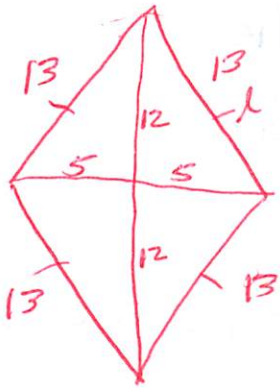


$s = \frac{12}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{12\sqrt{2}}{2}$

$s = 6\sqrt{2}$

S = $6\sqrt{2}$ cm = 8.5

4) The diagonals of a rhombus have lengths of 10 inches and 24 inches. Find the length of one of its sides and its perimeter.



$l = \sqrt{5^2+12^2} = 13$

S = 13 in

P = 52 in

Name _____ Date _____

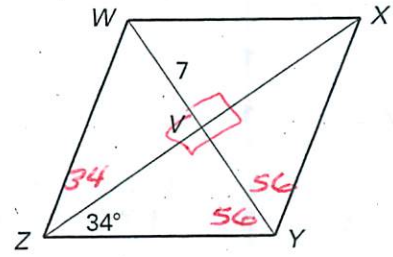
LESSON 8.4

LESSON 8.4 **Practice A** *continued*
For use 533–540

The diagonals of rhombus *WXYZ* intersect at *V*. Given that $m\angle XZY = 34°$ and *WV* = 7, find the indicated measure.

13. $m\angle WZV$ = 34° 14. $m\angle XYZ$ = 112°

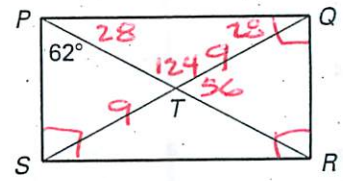
15. WY = 14 16. ~~XY~~



The diagonals of rectangle *PQRS* intersect at *T*. Given that $m\angle RPS = 62°$ and *QS* = 18, find the indicated measure.

17. $m\angle QPR$ ~~62°~~ 28° 18. $m\angle PTQ$ 124°

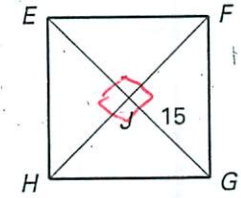
19. ST = 9 20. PR = 18



The diagonals of square *EFGH* intersect at *J*. Given that *GJ* = 15, find the indicated measure.

21. $m\angle EJF$ 90° 22. $m\angle JFG$ 45°

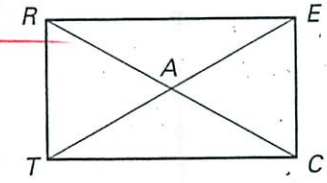
23. FH 30 24. EJ 15



25. Complete the proof.

GIVEN: *RECT* is a rectangle.

PROVE: $\triangle ART \cong \triangle ACE$



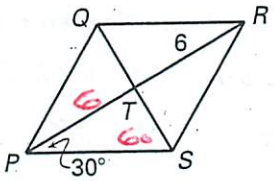
Statements	Reasons
1. ?	1. Given
2. $\overline{RT} \cong \overline{EC}$ $\overline{RT} \parallel \overline{EC}$	2. ?
3. ?	3. Alternate Interior ∡s are ≅.
4. ?	4. Vertical ∡s are ≅.
5. $\triangle ART \cong \triangle ACE$	5. ?

Name _____ Date _____

LESSON 8.4

LESSON 8.4 **Practice B** *continued*
For use with pages 533–540

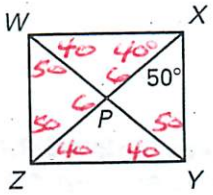
The diagonals of rhombus *PQRS* intersect at *T*. Given that $m\angle RPS = 30°$ and $RT = 6$, find the indicated measure.



13. $m\angle QPR$ $= 30°$ 14. $m\angle QTP$ $= 90°$

15. RP $= 12$ 16. QT $= TS = 2\sqrt{3}$

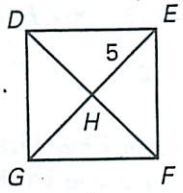
The diagonals of rectangle *WXYZ* intersect at *P*. Given that $m\angle YXZ = 50°$ and $XZ = 12$, find the indicated measure.



17. $m\angle WXZ$ $40°$ 18. $m\angle WPX$ $100°$

19. PY 6 20. WX (CAN'T DO)

The diagonals of square *DEFG* intersect at *H*. Given that $EH = 5$, find the indicated measure.

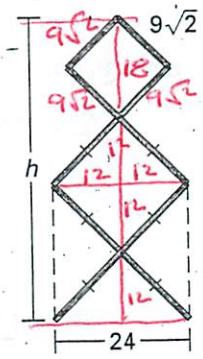


21. $m\angle GHF$ $90°$ 22. $m\angle DGH$ $45°$

23. HF 5 24. DE $5\sqrt{2}$

25. **Windows** In preparation for a storm, a window is protected by nailing boards along its diagonals. The lengths of the boards are the same. Can you conclude that the window is square? *Explain.* COULD BE A RHOMBUS

26. **Clothing** The side view of a wooden clothes dryer is shown at the right. Measurements shown are in inches.



$h = 18 + 24 + 12$

$h = 54$ INCHES

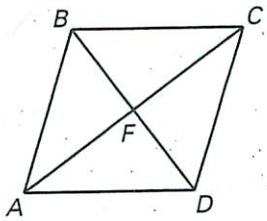
   a. The uppermost quadrilateral is a square. Classify the quadrilateral below the square. *Explain* your reasoning. (RHOMBUS)

   b. Find the height h of the clothes dryer.

27. **Proof** The diagonals of rhombus $ABCD$ form several triangles. Using a two-column proof, prove that $\triangle BFA \cong \triangle DFC$.

GIVEN: $ABCD$ is a rhombus.

PROVE: $\triangle BFA \cong \triangle DFC$



Name _____ Date _____

LESSON 8.4

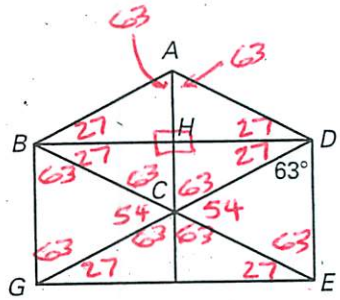
Practice C

For use with pages 533–540

Decide whether the statement is *true* or *false*. Decide whether the converse is *true* or *false*. If both statements are *true*, write a biconditional statement.

1. If a quadrilateral is a rectangle, then it is a parallelogram. T
2. If a quadrilateral is a parallelogram, then it is a rhombus. F
3. If a quadrilateral is a square, then it is a rhombus. F
4. If a quadrilateral is a rectangle, then it is a rhombus. F
5. If a rhombus is a square, then it is a rectangle. T

In the diagram shown, *BDEG* is a rectangle and *ABCD* is a rhombus. Find the measure of the indicated angle.



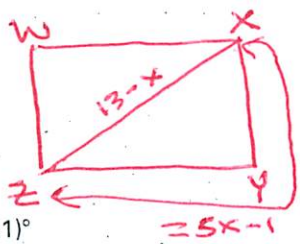
6. $\angle GDB$ 27°
7. $\angle ABC$ 54°
8. $\angle DAB$ 126°
9. $\angle BCG$ 54°
10. $\angle GCE$ 126°
11. $\angle DEG$ 90°
12. $\angle AHB$ 90°
13. $\angle DGB$ 63°

Find the length or angle measure.

14. $WXYZ$ is a square.
$WX = 1 - 10x$
$YZ = 14 + 3x$ = 11
$XY =$? 11
$1 - 10x = 14 + 3x$
$-13 = 13x$ $x = -1$

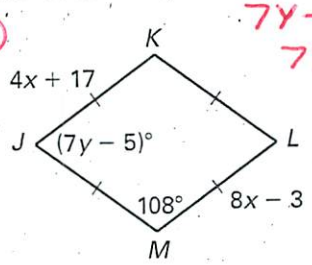
15. $WXYZ$ is a rhombus.
$m\angle X = 24(10 - x)°$
$m\angle Z = 6(x + 15)°$ = 120°
$m\angle Y =$? 60°
$\angle X = \angle Z$
$6x + 90 = 240 - 24x$
$30x = 150$ $x = 5$

16. $WXYZ$ is a rectangle.
Perimeter of $\triangle XYZ = 24$
$XZ = 13 - x$
$XY + YZ = 5x - 1$
$WY =$?



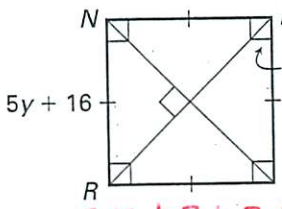
Classify the special quadrilateral. *Explain* your reasoning. Then find the values of *x* and *y*.

17. RHOMBUS



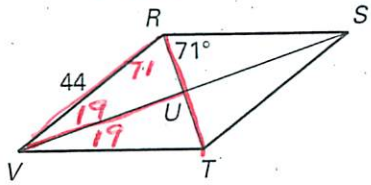
$7y - 5 = 72$
$7y = 77$
$y = 11$
$8x - 3 = 4x + 17$
$4x = 20$
$x = 5$

18.



$10y - 29 = 5y + 16$
$5y = 45$ $y = 9$
$6x + 21 = 45$
$6x = 24$ $x = 4$

The diagonals of rhombus *RSTV* intersect at *U*. Given that $m\angle URS = 71°$ and $RV = 44$, find the indicated measure.



19. $m\angle URV$ = 71°
20. $m\angle RVT$ = 38°
21. RT
22. SU