Unit 6 – Quadrilateral Review Sheet #1

Name______________________________

Directions: Show all work by drawing and labeling a picture for every problem.

1) $ABCD$ is a parallelogram. If $AB = 4x + 7$ and $CD = 3x + 12$, find AB and CD.

$4x+7=3x+12$

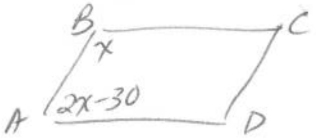
$x=5$

$AB=4(5)+7$

$AB=27$

$CD=27$

2) $ABCD$ is a parallelogram. The measure of ∠A is 30 degrees less than twice the measure of ∠B. Find the measure of each angle of the parallelogram.



$2x-30+x=180$

$3x-30=180$

$3x=210$

$x=70$

$m\angle A=2(70)-30$

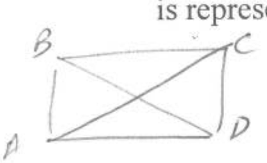
$=140-30$

$=110$

$m\angle A=m\angle C=110$

$m\angle B=m\angle D=70$

3) a) In rectangle $ABCD$, the length of diagonal $\overline{AC}$ is represented by $6x-2$ and the length of diagonal $\overline{BD}$ is represented by $4x+2$. Find the value of x.



$6x-2=4x+2$

$2x=4$

$x=2$

b) Find AC and BD.

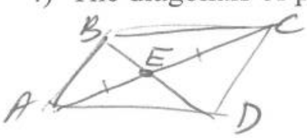
$AC=6(2)-2$

$AC=10$

$BD=4(2)+2$

$BD=10$

4) The diagonals of parallelogram $ABCD$ intersect at E. If $AE = 5x - 3$ and $EC = 15 - x$, find AC.



$5x-3=15-x$

$6x=18$

$x=3$

$AC=2(AE)$

$=2(5(3)-3)$

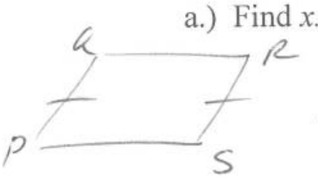
$=2(12)$

$AC=24$

5) In parallelogram $PQRS$, $PQ = x + 4$ and $SR = 3x - 36$.

a.) Find x.

b.) Find PQ and SR.



$x+4=3x-36$

$40=2x$

$x=20$

$PQ=20+4$

$PQ=24$

$SR=3(20)-36$

$SR=24$

c.) If $QR = 2x - 16$, show that $PQRS$ is a rhombus.

$2(20)-16$

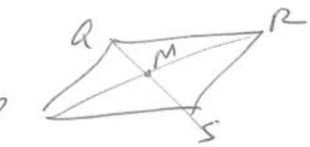
24

Since QR = PQ = RS and QR = PS since it is a ▱, PQRS is a rhombus because a ▱ with 4 ≅ sides is a rhombus.

Directions: Complete each of the following by choosing the answer which best completes the question.

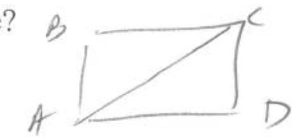
6) In parallelogram $PQRS$, diagonals $\overline{PR}$ and $\overline{QS}$ intersect at M. Which is always true? 6)______

(1) $\overline{PR} \perp \overline{QS}$ (2) $\overline{PM} \cong \overline{RM}$
(3) $\overline{PQ} \cong \overline{QR}$ (4) $\Delta PMS \cong \Delta PMQ$



7) In rectangle $ABCD$, $\overline{AC}$ is a diagonal. Which is always true? 7)______

(1) $\overline{AB} \cong \overline{AC}$ (2) $\overline{AB} \cong \overline{AD}$
(3) $m\angle DAC \cong m\angle BAC$ (4) $\Delta DAC \cong \Delta BCA$



8) A quadrilateral whose diagonals are congruent but are not perpendicular to each other is: 8)______

(1) a rectangle (2) a rhombus
(3) a parallelogram (4) a square

or isosceles trapezoid

9) A quadrilateral whose diagonals are perpendicular to each other is: 9)______

(1) a rectangle (2) a rhombus
(3) a parallelogram (4) a trapezoid

10) A quadrilateral that is equiangular but not equilateral is: 10)______

(1) a rectangle (2) a rhombus
(3) a square (4) a parallelogram

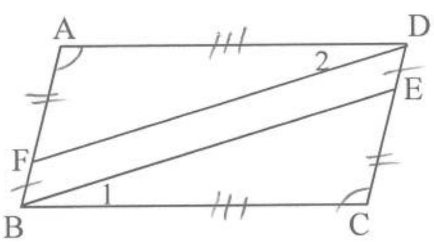
11) Which of the following statements is false? 11)______

(1) A square is a rhombus (2) A rhombus is a square
(3) A square is a rectangle (4) A rhombus is a parallelogram

12) The diagonals of a rectangle are always: 12)______

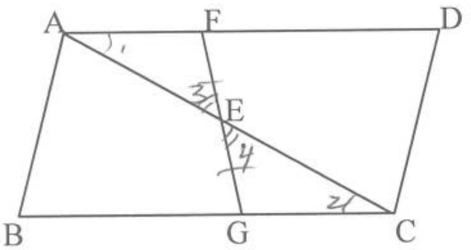
(1) congruent (2) perpendicular to each other
(3) parallel (4) bisectors of the angles of the rectangle

13)



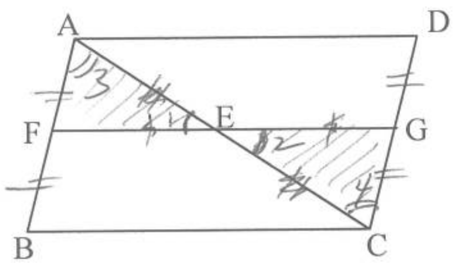
Prove: $\angle 1 \cong \angle 2$

Statements	Reasons
1.) $ABCD$ is a para $\overline{BF} \cong \overline{DE}$	1.) Given
2) $AB = AF + FB$ $DC = DE + EC$	2) A whole is the sum of its parts
3) $\overline{AB} \cong \overline{CD}$, $\overline{BC} \cong \overline{AD}$	3) opp. sides of a ▱ are ≅
4) $AF + FB = DE + EC$	4) Substitution
5) $\overline{AF} \cong \overline{CE}$	5) Subtraction
6) $\angle A \cong \angle C$	6) opp. ∠s of a ▱ are ≅
7) $\Delta FAD \cong \Delta ECB$	7) SAS ≅ SAS
8) $\angle 1 \cong \angle 2$	8) CPCTC

14) 

Prove: E mdpt $\overline{AC}$

Statements	Reasons
1.) *ABCD* is a para E mdpt $\overline{FG}$	1.) Given
2) $\overline{FE} \cong \overline{GE}$	2) A midpt. ÷s a seg. into 2 ≅ segments
3) $\overline{AD} \parallel \overline{CB}$	3) opp. sides of a ▱ are ∥.
4) $\angle 1 \cong \angle 2$	4) if 2 ∥ lines are cut by a transv. then alt. int. ∠s are ≅
5) $\angle 3 \cong \angle 4$	5) vertical ∠s are ≅
6) $\triangle AEF \cong \triangle CEG$	6) AAS ≅ AAS
7) $\overline{AE} \cong \overline{CE}$	7) CPCTC
8) E is the midpt of $\overline{AC}$	8) A midpt ÷s a seg. into 2 ≅ segments

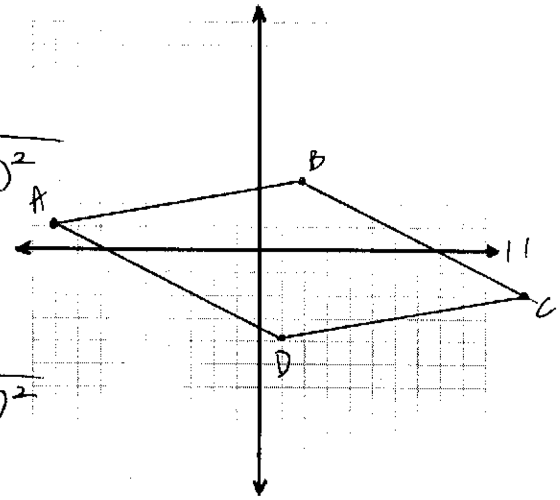
15) 

Prove: E mdpt $\overline{AC}$

Statements	Reasons
1.) *ABCD* is a para F mdpt $\overline{AB}$ G mdpt $\overline{CD}$	1.) Given
2) ~~$\overline{FE} \cong \overline{GE}$~~, $\overline{AF} \cong \overline{BF}$ ~~$\overline{AE} \cong \overline{CE}$~~ $\overline{CG} \cong \overline{DG}$ $AF = \frac{1}{2}AB$, $CG = \frac{1}{2}CD$	2) A midpt ÷s a segment into 2 ≅ segments each $\frac{1}{2}$ the length of the whole.
3) $\overline{AB} \cong \overline{CD}$	3) opp. sides of a ▱ are ≅
4) $\overline{AF} \cong \overline{CG}$	4) Halves of ≅ segments are ≅
5) $\angle 1 \cong \angle 2$	5) vertical ∠s are ≅
6) $\overline{AB} \parallel \overline{CD}$	6) opp. sides of a ▱ are ∥.
7) $\angle 3 \cong \angle 4$	7) if 2 ∥ lines are cut by a transv. then alt. int. ∠s are ≅
8) $\triangle AEF \cong \triangle CEG$	8) AAS ≅ AAS
9) $\overline{AE} \cong \overline{CE}$	9) CPCTC
10) E is midpt of $\overline{AC}$	10) A midpt ÷s a seg. into 2 ≅ seg

Directions: *Given each set of vertices, determine whether* **parallelogram** *ABCD is a rhombus, a rectangle, or a square. List all that apply and* ***PROVE YOUR CHOICE.***

15) $A(-9, 1)$, $B(2, 3)$, $C(12, -2)$, $D(1, -4)$



$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$AB = \sqrt{(2+9)^2 + (3-1)^2}$
$= \sqrt{121 + 4}$
$= \sqrt{125}$

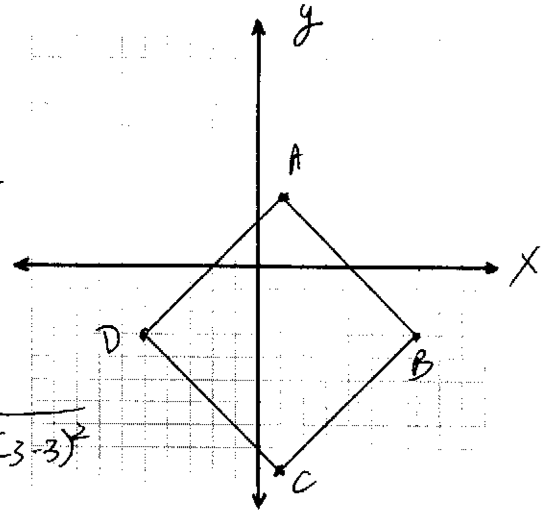
$BC = \sqrt{(12-2)^2 + (-2-3)^2}$
$= \sqrt{100 + 25}$
$= \sqrt{125}$

$CD = \sqrt{(1-12)^2 + (-4+2)^2}$
$= \sqrt{121 + 4}$
$= \sqrt{125}$

$AD = \sqrt{(1+9)^2 + (-4-1)^2}$
$= \sqrt{100 + 25}$
$= \sqrt{125}$

Since the lengths of $\overline{AB}$, $\overline{BC}$, $\overline{CD}$, and $\overline{AD}$ are =, $\overline{AB} \cong \overline{BC} \cong \overline{CD} \cong \overline{AD}$.
A quad w/ 4 ≅ sides is a rhombus, so ABCD is a rhombus.

16) $A(1, 3)$, $B(7, -3)$, $C(1, -9)$, $D(-5, -3)$



$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$AB = \sqrt{(7-1)^2 + (-3-3)^2}$
$= \sqrt{36 + 36}$
$= \sqrt{72}$

$BC = \sqrt{(1-7)^2 + (-9+3)^2}$
$= \sqrt{36 + 36}$
$= \sqrt{72}$

$CD = \sqrt{(-5-1)^2 + (-3+9)^2}$
$= \sqrt{36 + 36}$
$= \sqrt{72}$

$AD = \sqrt{(-5-1)^2 + (-3-3)^2}$
$= \sqrt{36 + 36}$
$= \sqrt{72}$

Since the lengths of $\overline{AB}$, $\overline{BC}$, $\overline{CD}$, and $\overline{AD}$ are all =, $\overline{AB} \cong \overline{BC} \cong \overline{CD} \cong \overline{AD}$.
A quad with 4 ≅ sides is a rhombus so ABCD is a rhombus.

$BD = \sqrt{(-5-7)^2 + (-3+3)^2}$
$= \sqrt{144}$
$= 12$

$AC = \sqrt{(1-1)^2 + (-9-3)^2}$
$= \sqrt{144}$
$= 12$

Since the lengths of $\overline{BD}$ and $\overline{AC}$ are =, $\overline{BD} \cong \overline{AC}$.
A rhombus with ≅ diagonals is a square, so ABCD is a square.