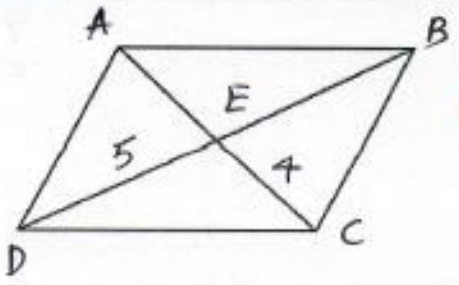
Geometry Review: Chapter 9 Properties of Quadrilaterals Name: Key Hr: __

1. Parallelogram $ABCD$ is shown.
   a. Name the pair of triangles that can be established to be congruent to prove that $\angle DAB \cong \angle BCD$.
   b. Find BD.

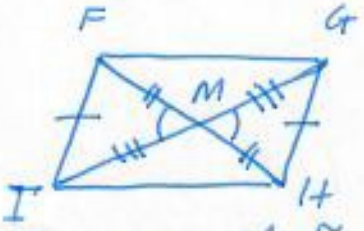
BD = 2DE = 2(5) = 10



△DAB ≅ △BCD
Corresponding ∠s ≅ by CPCTC

2. In parallelogram $FGHI$, diagonals $\overline{IG}$ and $\overline{FH}$ are drawn to intersect at point M. Which of the following statements *must* be true?

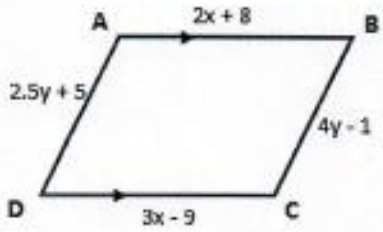
A) ΔFGI must be an obtuse triangle
B) ΔHGI must be an acute triangle
C) ΔFMG must be congruent to ΔHMG
D) ΔGMH must be congruent to ΔIMF



*opp. sides ≅
$\overline{AB} \cong \overline{CD}$
2x+8 = 3x-9
x = 17
AB = 2(17)+8 = 42

3. Using the properties of parallelograms, find AB and AD

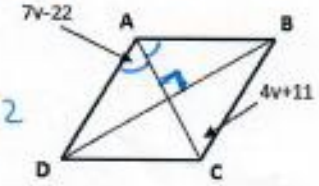
*(opp. sides ≅)
$\overline{AD} \cong \overline{BC}$
2.5y+5 = 4y-1
1.5y = 6
y = 4
AD = 2.5(4)+5 = 15



4. Which of the following is NOT a way to prove a quadrilateral is a parallelogram?
   A) Show the diagonals of the quadrilateral bisect each other.
   B) Show one pair of opposite sides of the quadrilateral are both parallel and congruent.
   C) Show one pair of opposite angles of the quadrilateral are congruent.
   D) Show both pairs of opposite sides of the quadrilateral are congruent.

5. Using the properties of rhombuses, find: m∠ABC, m∠BAD, m∠ADC, m∠DAC.

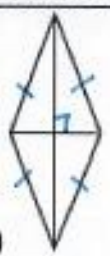
∠DAC ≅ ∠BCA (AIA) * Diagonal bisect opp. pairs of angles ∠DAC ≅ ∠BAC
7v-22 = 4v+11
3v = 33
v = 11, ∠DAC = 7v-22 = 7(11)-22 = 55°
∠BCA = 4v+11 = 55°
mABC = 90 - ∠BCA = 90-55 = 35°
mBAD = 2∠DAC = 2(55) = 110°
m∠ADC = 2∠BCA = 2(35) = 70°

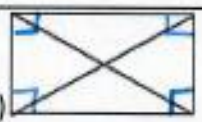


6. Given the conditional statement: If a quadrilateral has perpendicular diagonals, then it is a rhombus. Which of the following is a counterexample to the statement above?

a) kite 

b)  square rhombus

c)  Rhombus

d)  Rectangle

7. $ABCD$ is a parallelogram. If adjacent angles are congruent, which statement must be true?

A) Quadrilateral $ABCD$ is a square. (sometimes, only if [adjacent sides] are also consecutive $\cong$)

B) Quadrilateral $ABCD$ is a rhombus.

C) Quadrilateral $ABCD$ is a rectangle. (always)

D) Quadrilateral $ABCD$ is an isosceles trapezoid.

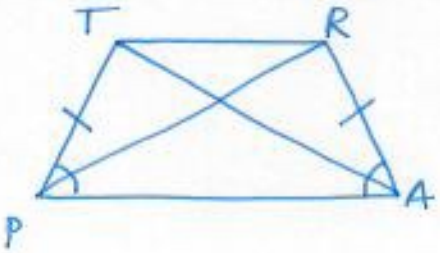
8. $TRAP$ is an isosceles trapezoid with diagonals $\overline{RP}$ and $\overline{TA}$. Which of the following *must* be true?

A) $\overline{RP} \perp \overline{TA}$

B) $\overline{RP} \parallel \overline{TA}$

C) $\overline{RP} \cong \overline{TA}$

D) $\overline{RP}$ bisects $\overline{TA}$

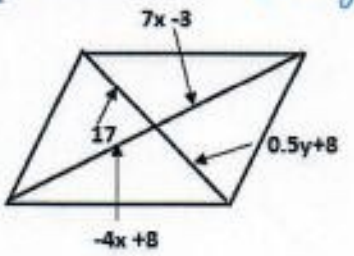


9. Using the properties of parallelograms, find x and y (Diagonals bisect eachother)

$7x-3 = -4x+8$

$11x = 11$

$x = 1$



$0.5y + 8 = 17$

$0.5y = 9$

$y = \frac{9}{0.5} = 18$

* 10. 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.

→ Parallelogram need 1 pair of opp. sides $\parallel$ and $\cong$

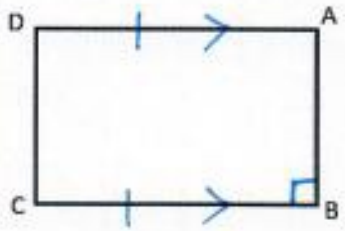
A) rectangle

B) rhombus

C) square

D) trapezoid (one pair of opp sides $\parallel$)

11. In order to prove quadrilateral ABCD is a rectangle, what would have to be true?



A. $\overline{AD} \parallel \overline{BC}$ and $m\angle B = 90°$

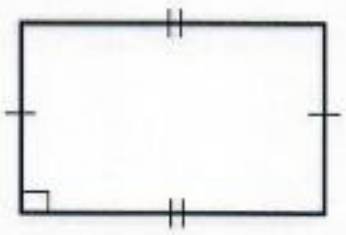
B. $\overline{AD} \parallel \overline{BC}$ and $\overline{AB} \parallel \overline{DC}$

C. $\overline{AD} \parallel \overline{BC}$ and $\overline{AD} \cong \overline{BC}$

D. $\overline{AD} \parallel \overline{BC}$ and $\overline{AD} \cong \overline{BC}$ and $m\angle B = 90°$

12. State all possible names of the quadrilateral below:

parallelogram
rectangle

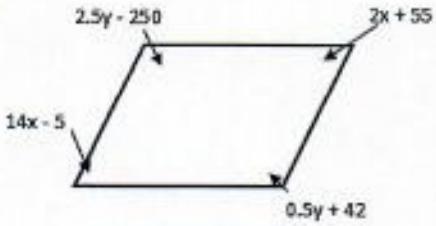


13. For the parallelogram below find x and y (opp. pairs of ∠'s ≅)

$2.5y - 250 = 0.5y + 42$

$2y = 292$

$y = 146$



$14x - 5 = 2x + 55$

$12x = 60$

$x = 5$

14. What formulas are needed to create a coordinate proof of a parallelogram?

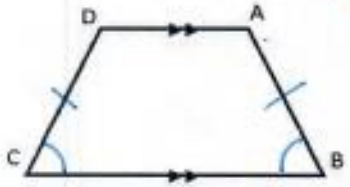
A. Slope formula to prove that opposite sides are parallel

B. Distance formula to prove that opposite sides are congruent

C. Slope formula to prove that any two consecutive sides form a right angle

D. Distance formula and slope formula to prove that all sides are parallel and congruent

15. Use the properties of an isosceles trapezoid and



a. $m\angle C = 12x - 2$ $m\angle B = 5x + 26$. find: $m\angle B$ and $m\angle D$

$m\angle C = m\angle B$

$12x - 2 = 5x + 26$

$7x = 28$

$x = 4$

$m\angle B = m\angle D$

$= 12x - 2$

$= 12(4) - 2$

$= \boxed{46^\circ}$

b. AB = 2y + 5 and CD = 3y - 1. Find length of AB,

$AB = CD$

$2y + 5 = 3y - 1$

$y = 6$

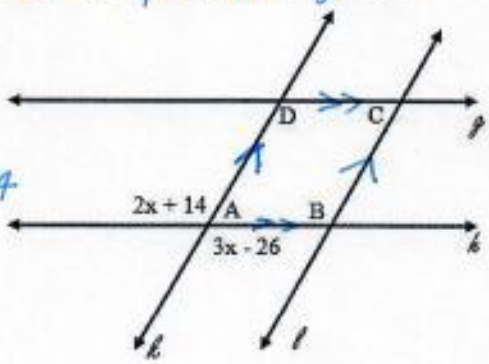
$AB = 2y + 5$

$= 2(6) + 5$

$= \boxed{17}$

16. Assume $g \parallel h$ and $k \parallel l$. Find the measure of the four angles marked on the figure.

↳ ABCD is a parallelogram.



$2x + 14 = 3x - 26$

$x = 40$

$m\angle D = m\angle B = 2x + 14$

$= 2(40) + 14$

$= \boxed{94^\circ}$

$m\angle A = m\angle C$

$= 180 - 94 = \boxed{86^\circ}$

∠D is alternate int. to 4(2x+14)

∠B is correspondingto

∠A is supplementary to ∠(2x+14)

∠C is opposite to ∠A and ≅ to

17. In the diagram below, parallelogram ABCD has diagonals AC and BD that intersect at point E. Which expression is not always true?

a. ∠DAE ≅ ∠BCE

b. AC ≅ DB

c. ∠DEC ≅ ∠BEA

d. DE ≅ EB