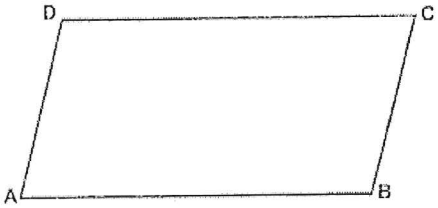
Name: Key Hour: _____

Practice Examples: Parallelogram Properties

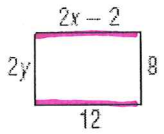


- Four sides.
- Both pairs of opposite sides are parallel.
- Both pairs of opposite sides are congruent.
- Both pairs of opposite angles are congruent.
- Diagonals bisect each other.

Make sure you justify each step!

Find x and y so that each quadrilateral is a parallelogram.

1.



op. sides of a Parallelogram are ≅

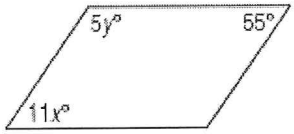
$2x - 2 = 12$

$\boxed{x = 7}$

$2y = 8$

$\boxed{y = 4}$

2.



op. ∠s of a para are ≅

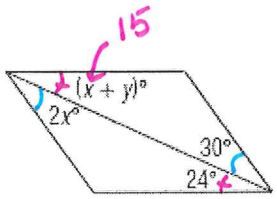
$11x = 55$

$\boxed{x = 5}$

$5y + 55 = 180$ con. int ∠s of a para are suppl.

$\boxed{y = 25}$

3.



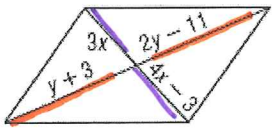
$2x = 30$ // lines form ≅ alt int ∠s.

$\boxed{x = 15}$

$15 + y = 24$ // form ≅ alt int ∠

$\boxed{y = 9}$

4.



diagonals of a Parallelogram bisect each other

$3x = 4x - 3$

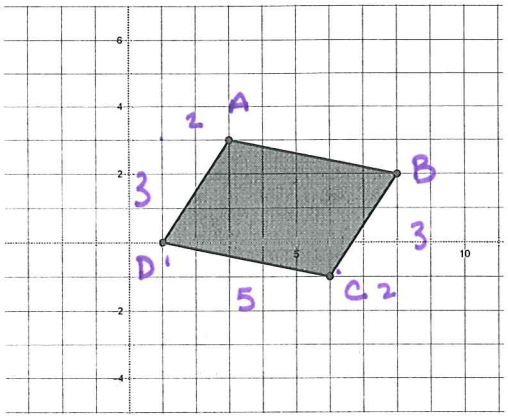
$\boxed{x = 3}$

$y + 3 = 2y - 11$

$\boxed{y = 14}$

Coordinate Examples:

5. Determine whether the figure with vertices A(3,3), B(8,2), C(6,-1), D(1,0) is a parallelogram.
To be a parallelogram, you must test for op. sides parallel
= same slopes.



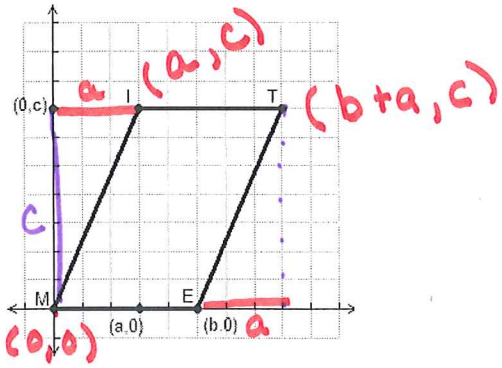
Slope DA = $\frac{3}{2}$
Slope CB = $\frac{3}{2}$ } //

Slope DC = $-\frac{1}{5}$
Slope AB = $\frac{-1}{5}$ } //

Must say:
DA // CB and DC // AB
so op. sides are //
∴ ABCD is a parallelogram by definition

6. a. Set up the coordinates for the four vertices of the given parallelogram.

M(0,0)
E(b,0)
T(b+a,c)
I(a,c)



b. Prove that your coordinates constructed a parallelogram.

Slope MI = $\frac{c}{a}$
Slope ET = $\frac{c}{a}$

Slope ME = 0
Slope IT = 0

MI // ET and ME // IT ∴ it is a parallelogram by definition

c. Define the term segment bisector.

a segment (line or ray) which cuts another segment into 2 ≅ segments.

d. Write the definition of segment bisector as a biconditional, iff (if and only if), statement.

A line, segment or ray is a segment bisector iff it cuts a segment into 2 ≅ segments.

e. Prove that the diagonals of a parallelogram bisect each other.

Must have same midpts

EI midpt: $\left(\frac{b+a}{2}, \frac{c}{2}\right)$

MT = $\left(\frac{b+a}{2}, \frac{c}{2}\right)$