Name: Key Date: _____

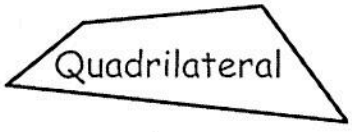
UNIT 7 **LESSON 8**

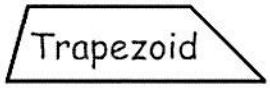
AIM: HOW DO WE IDENTIFY QUADRILATERALS USING COORDINATE GEOMETRY?

ALWAYS

SOMETIMES

NEVER





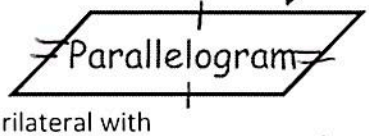
**Look up, this shape is ALWAYS that shape.

**Look down, this shape is SOMETIMES that shape.

**Look left/right, this shape is NEVER that shape.

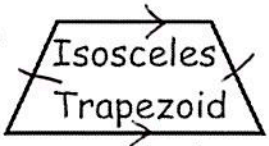
A quadrilateral with

1. AT LEAST one pair of opposite sides ∥.



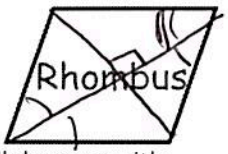
A quadrilateral with

1. Opposite sides ≅ and ∥.
2. Opposite angles are ≅.
3. Diagonals bisect each other.
4. Consecutive angles add to 180°.



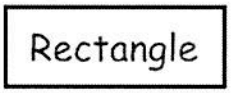
A trapezoid with

1. Non-Parallel sides ≅.
2. Base angles ≅.
3. Diagonals ≅.



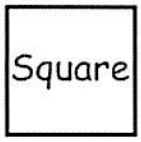
A parallelogram with

1. All sides ≅.
2. Diagonals ⊥ and bisect ∠'s.



A parallelogram with

1. All angles ≅ (4 right ∠'s).
2. Diagonals ≅.



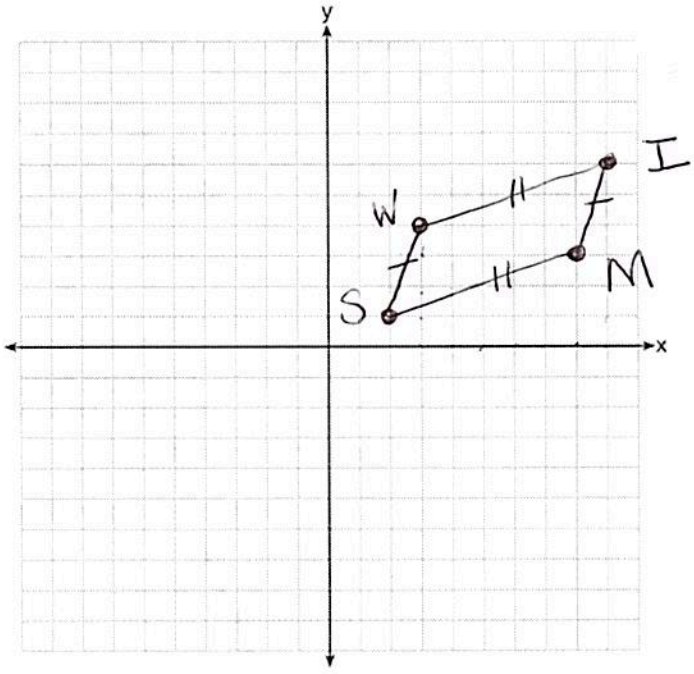
A parallelogram with

1. All sides ≅.
2. All angles ≅ (right ∠'s)
3. Diagonals ≅, ⊥ and bisect ∠'s.

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

1. Quadrilateral SWIM has the coordinates S(2,1) W(3,4) I(9,6) M(8,3)
   a) Graph SWIM
   b) Find the distance of ALL sides and diagonals.

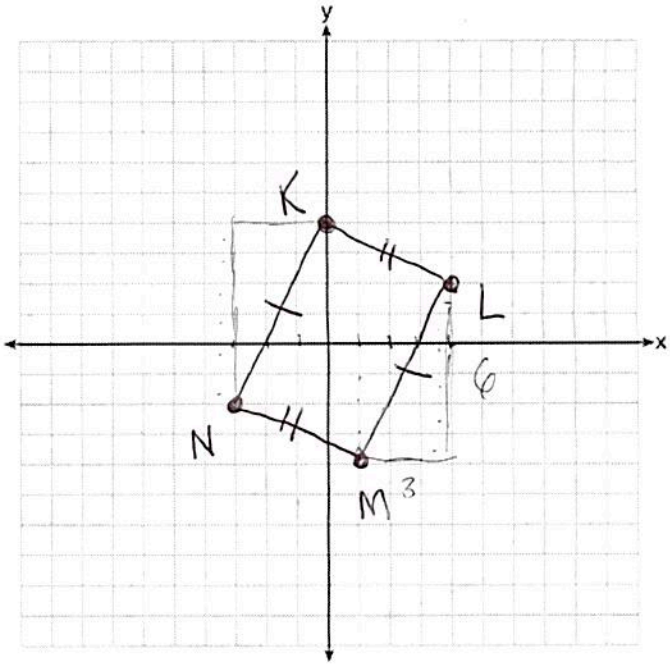
SEGMENT	LENGTH
SW	$\overline{SW} = \sqrt{(3-2)^2 + (4-1)^2}$ $\overline{SW} = \sqrt{10}$
WI	$\overline{WI} = \sqrt{(9-3)^2 + (6-4)^2}$ $\overline{WI} = \sqrt{40}$
IM	$\overline{IM} = \sqrt{(8-9)^2 + (3-6)^2}$ $\overline{IM} = \sqrt{10}$
SM	$\overline{SM} = \sqrt{(8-2)^2 + (3-1)^2}$ $\overline{SM} = \sqrt{40}$
SI	$\overline{SI} = \sqrt{(9-2)^2 + (6-1)^2}$ $\overline{SI} = \sqrt{74}$
WM	$\overline{WM} = \sqrt{(8-3)^2 + (3-4)^2}$ $\overline{WM} = \sqrt{26}$



Quadrilateral SWIM is a parallelogram
because opp. sides are ≅ but diagonals are not ≅

2. Quadrilateral KLMN has the vertices $K(0,4)$, $L(4,2)$, $M(1,-4)$ and $N(-3,-2)$.
   a) Graph KLMN
   b) Find the distance of ALL sides and diagonals

SEGMENT	LENGTH
KL	$\overline{KL} = \sqrt{(4-0)^2 + (2-4)^2}$ $\overline{KL} = \sqrt{20}$
MN	$\overline{MN} = \sqrt{(-3-1)^2 + (-2-4)^2}$ $\overline{MN} = \sqrt{20}$
LM	$\overline{LM} = \sqrt{(1-4)^2 + (-4-2)^2}$ $\overline{LM} = \sqrt{45}$
KN	$\overline{KN} = \sqrt{(-3-0)^2 + (-2-4)^2}$ $\overline{KN} = \sqrt{45}$
KM	$\overline{KM} = \sqrt{(1-0)^2 + (-4-4)^2}$ $\overline{KM} = \sqrt{65}$
LN	$\overline{LN} = \sqrt{(-3-4)^2 + (-2-2)^2}$ $\overline{LN} = \sqrt{65}$



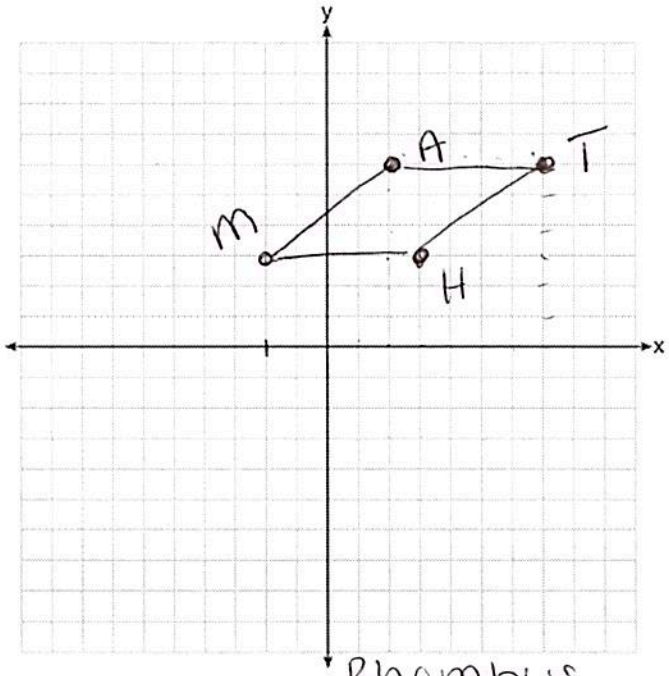
Quadrilateral KLMN is a rectangle
because opp sides are ≅ and diagonals are ≅

3. Quadrilateral MATH has the vertices $M(-2,3), A(2,6), T(7,6)$ *and* $H(3,3)$.

a) Graph MATH

b) Find the distance of ALL sides and diagonals

EGMENT	LENGTH
MA	$\sqrt{(2--2)^2+(6-3)^2}$ $\sqrt{25}=5$
AT	$\sqrt{(7-2)^2+(6-6)^2}$ $\sqrt{25}=5$
TH	$\sqrt{(3-7)^2+(3-6)^2}$ $\sqrt{25}=5$
HM	$\sqrt{(3--2)^2+(3-3)^2}$ $\sqrt{25}=5$
MT	$\sqrt{(7--2)^2+(6-3)^2}$ $\sqrt{90}$
AH	$\sqrt{(3-2)^2+(3-6)^2}$ $\sqrt{10}$



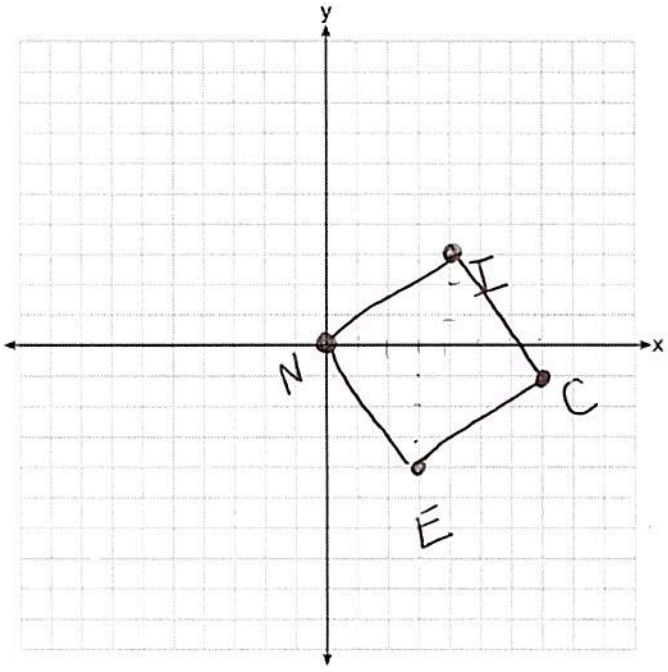
Quadrilateral MATH is a Rhombus **because** all sides are ≅ but diagonals are not ≅

4. Quadrilateral NICE has the vertices $N(0,0)$, $I(4,3)$, $C(7,-1)$ *and* $E(3,-4)$:

a) Graph NICE

b) Find the distance of all sides and diagonals

SEGMENT	LENGTH
NI	$\sqrt{(4-0)^2+(3-0)^2}$ $\sqrt{25}=5$
IC	$\sqrt{(7-4)^2+(-1-3)^2}$ $\sqrt{25}=5$
CE	$\sqrt{(3-7)^2+(-4--1)^2}$ $\sqrt{25}=5$
EN	$\sqrt{(3-0)^2+(-4-0)^2}$ $\sqrt{25}=5$
NC	$\sqrt{(7-0)^2+(-1-0)^2}$ $\sqrt{50}$
IE	$\sqrt{(3-4)^2+(-4-3)^2}$ $\sqrt{50}$



Quadrilateral MATH is a square **because** all sides and diagonals are ≅

CONCLUSION:

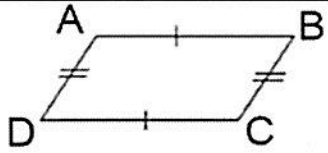
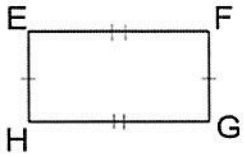
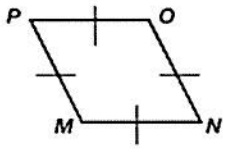
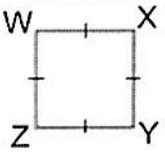
Proving ANY of the above Quadrilaterals on a Graph

Step 1: (e distance formula (sides/diagonals)

Step 2: Apply properties of quadrilaterals

EXIT TICKET!

Quadrilaterals (based on side/diagonal lengths)

			
$AB = \sqrt{52}$ $BC = \sqrt{20}$ $CD = \sqrt{52}$ $DA = \sqrt{20}$	$EF = \sqrt{48}$ $FG = \sqrt{18}$ $GH = \sqrt{48}$ $HE = \sqrt{18}$	$PO = \sqrt{28}$ $ON = \sqrt{28}$ $NM = \sqrt{28}$ $MP = \sqrt{28}$	$WX = \sqrt{44}$ $XY = \sqrt{44}$ $YZ = \sqrt{44}$ $ZW = \sqrt{44}$
$AC = \sqrt{32}$ $BD = \sqrt{70}$	$EG = \sqrt{56}$ $FH = \sqrt{56}$	$PN = \sqrt{36}$ $OM = \sqrt{25}$	$WY = \sqrt{56}$ $XZ = \sqrt{56}$
This quadrilateral is a parallelogram because opp sides are ≅ and diagonals are not ≅	This quadrilateral is a rectangle because opp. sides are ≅ and diagonals are ≅	This quadrilateral is a rhombus because all sides are ≅ but diagonals are not ≅	This quadrilateral is a square because all sides and diagonals are ≅