Name: Key

Date: ____________________

UNIT 7

LESSON 12

AIM: HOW DO WE COMPELTE "NOT" COORDINATE PROOFS?

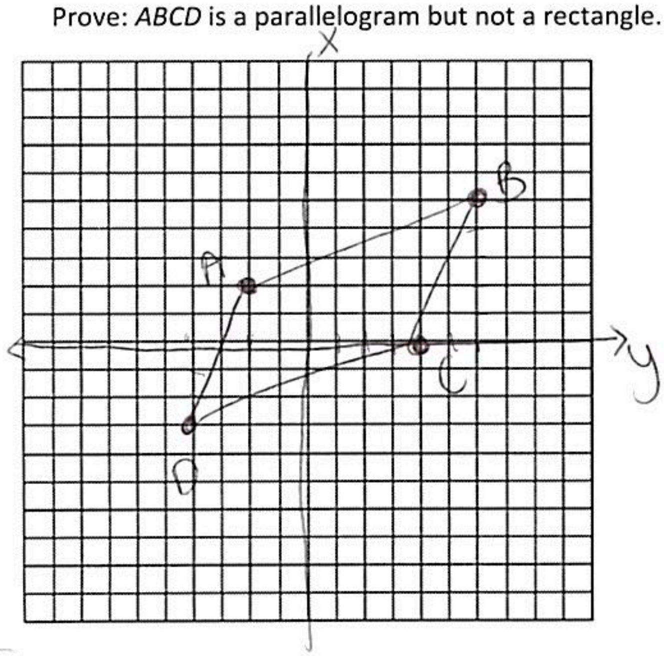
Do Now: Place check marks in the appropriate boxes for the following properties of quadrilaterals.

	OPPOSITE SIDES ARE CONGUENT	OPPOSITE SIDES ARE PARALLEL	ALL SIDES ARE CONGRUENT	OPPOSITE ANGLES ARE CONGRUENT	ALL ANGLES ARE CONGRUENT	DIAGONALS ARE PERPENDICULAR	DIAGONALS ARE CONGRUENT
PARALLELOGRAMS	✓	✓		✓			
RECTANGLES	✓	✓		✓	✓		✓
RHOMBUS	✓	✓	✓	✓		✓	
SQUARES	✓	✓	✓	✓	✓	✓	✓
TRAPEZOID		✓* one pair					
ISOSCELES TRAPEZOID	✓* one pair	✓					✓

N' we are trying to prove something is **NOT** a certain quadrilateral, we complete the same steps as if it were and make our conclusions to prove the properties of the quadrilaterals are ***not*** met.

1) Given: $A(-2,2)$, $B(6,5)$, $C(4,0)$, $D(-4,-3)$

Prove: *ABCD* is a parallelogram but not a rectangle. [The use of the grid is optional.]



$\overline{AB} = \sqrt{(6--2)^2+(5-2)^2} = \sqrt{73}$

$\overline{BC} = \sqrt{(4-6)^2+(0-5)^2} = \sqrt{29}$

$\overline{CD} = \sqrt{(-4-4)^2+(-3-0)^2} = \sqrt{73}$

$\overline{AD} = \sqrt{(-4--2)^2+(-3-2)^2} = \sqrt{29}$

$\overline{AC} = \sqrt{(4--2)^2+(0-2)^2} = \sqrt{40}$

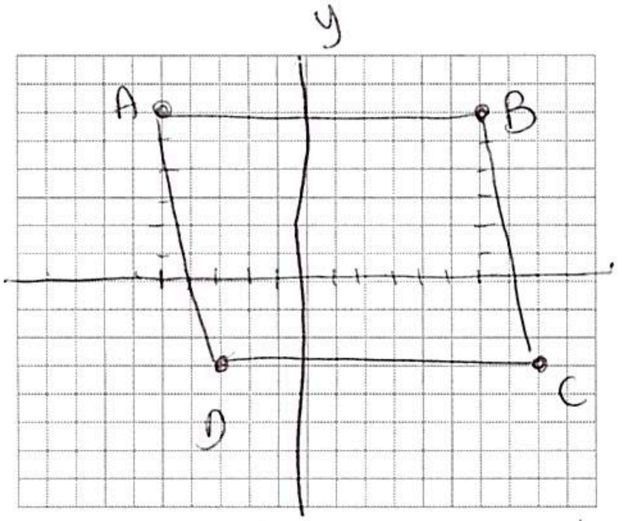
$\overline{BD} = \sqrt{(-4-6)^2+(-3-5)^2} = \sqrt{164}$

CONCLUSION: ABCD is a ▱ but not a rectangle b/c opp sides are ≅ but diagonals are not.

2) Given: Quadrilateral *ABCD* has vertices $A(-5,6)$, $B(6,6)$, $C(8,-3)$, and $D(-3,-3)$.

Prove: Quadrilateral *ABCD* is a parallelogram but is neither a rhombus nor a rectangle.

[The use of the grid below is optional.]



$AB = \sqrt{(6--5)^2+(6-6)^2} = \sqrt{121}$

$BC = \sqrt{(8-6)^2+(-3-6)^2} = \sqrt{85}$

$CD = \sqrt{(-3-8)^2+(-3--3)^2} = \sqrt{121}$

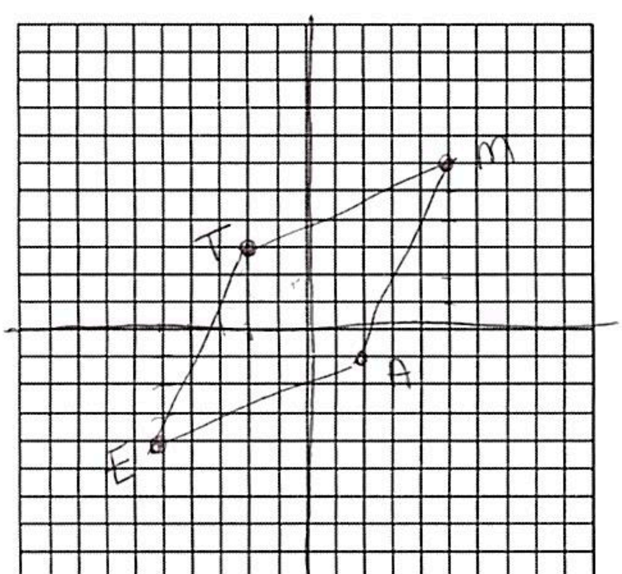
$AD = \sqrt{(-3--5)^2+(-3-6)^2} = \sqrt{85}$

$AC = \sqrt{(8--5)^2+(-3-6)^2} = \sqrt{250}$

$BD = \sqrt{(-3-6)^2+(-3-6)^2} = \sqrt{162}$

CONCLUSION: ABCD is a ▱ b/c opp. sides are ≅. It is not a rhombus b/c all sides are not ≅ and not a rectangle b/c diagonals are not ≅

3) Jim is experimenting with a new drawing program on his computer. He created quadrilateral *TEAM* with coordinates $T(-2,3)$, $E(-5,-4)$, $A(2,-1)$, and $M(5,6)$. Jim believes that he has created a rhombus but not a square. Prove that Jim is correct. [The use of the grid is optional.]



$\overline{TE} = \sqrt{(-5--2)^2+(-4-3)^2} = \sqrt{58}$

$\overline{EA} = \sqrt{(2--5)^2+(-1--4)^2} = \sqrt{58}$

$\overline{AM} = \sqrt{(5-2)^2+(6--1)^2} = \sqrt{58}$

$\overline{TM} = \sqrt{(5--2)^2+(6-3)^2} = \sqrt{58}$

$\overline{TA} = \sqrt{(2--2)^2+(-1-3)^2} = \sqrt{32}$

$EM = \sqrt{(5--5)^2+(6--4)^2} = \sqrt{200}$

CONCLUSION: TEAM is a rhombus b/c all sides are ≅ but not a square b/c diagonals are not ≅

4) Quadrilateral *ABCD* with vertices $A(-7,4)$, $B(-3,6)$, $C(3,0)$, and $D(1,-8)$ is graphed on the set of axes below.

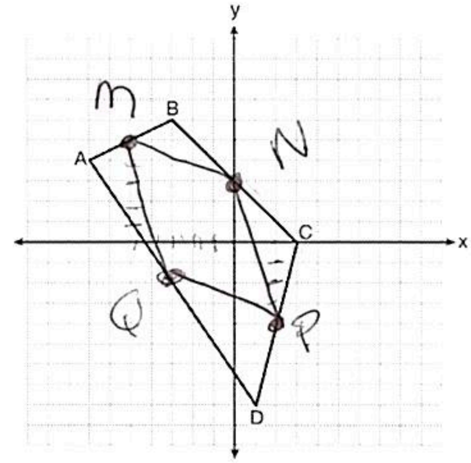
a) Quadrilateral *MNPQ* is formed by joining *M*, *N*, *P*, and *Q*, the midpoints of $\overline{AB}$, $\overline{BC}$, $\overline{CD}$, and $\overline{AD}$, respectively. Find *M*, *N*, *P*, and *Q*

$M = \left(\frac{-7+-3}{2}, \frac{4+6}{2}\right) = (-5, 5)$

$N = \left(\frac{-3+3}{2}, \frac{6+0}{2}\right) = (0, 3)$

$P = \left(\frac{3+1}{2}, \frac{0+-8}{2}\right) = (2, -4)$

$Q = \left(\frac{-7+1}{2}, \frac{4+-8}{2}\right) = (-3, -2)$



b) Prove that quadrilateral *MNPQ* is a parallelogram.

$MN = \sqrt{(0--5)^2+(3-5)^2} = \sqrt{29}$

$NP = \sqrt{(2-0)^2+(-4-3)^2} = \sqrt{53}$

$PQ = \sqrt{(-3-2)^2+(-2-4)^2} = \sqrt{29}$

$mQ = \sqrt{(-3--5)^2+(2-5)^2} = \sqrt{53}$

$mP = \sqrt{(2-5)^2+(-4-5)^2} = \sqrt{130}$

$QN = \sqrt{(-3-0)^2+(-2-3)^2} = \sqrt{34}$

c) Prove that quadrilateral *MNPQ* is *not* a rhombus.

CONCLUSION: ABCD is ~~[illegible]~~ a parallelogram b/c opp. sides are $\cong$

It is not a rhombus b/c all sides are not $\cong$

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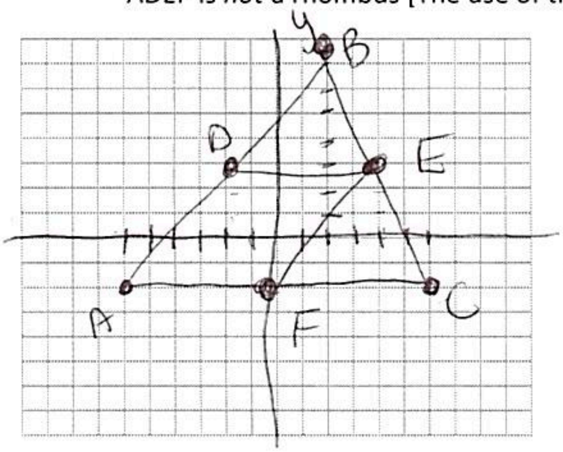
UNIT 7 **LESSON 12 HOMEWORK**

1) Given: $\triangle ABC$ with vertices $A(-6,-2)$, $B(2,8)$, and $C(6,-2)$. $\overline{AB}$ has midpoint *D*, $\overline{BC}$ has midpoint *E*, and $\overline{AC}$ has midpoint *F*.

Prove: *ADEF* is a parallelogram *(HINT: Find the midpoints fisrt!)*

ADEF is *not* a rhombus [The use of the grid is optional.]



$mp_{AB} = \left(\frac{-6+2}{2}, \frac{-2+8}{2}\right) = (-2, 3) = D$

$mp_{BC} = \left(\frac{2+6}{2}, \frac{8+-2}{2}\right) = (4, 3) = E$

$mp_{AC} = \left(\frac{-6+6}{2}, \frac{-2+-2}{2}\right) = (0, -2) = F$

$\overline{AD} = \sqrt{(-2--6)^2+(3-2)^2} = \sqrt{41}$

$\overline{DE} = \sqrt{(4-2)^2+(3-3)^2} = \sqrt{36}$

$\overline{EF} = \sqrt{(0-4)^2+(-2-3)^2} = \sqrt{41}$

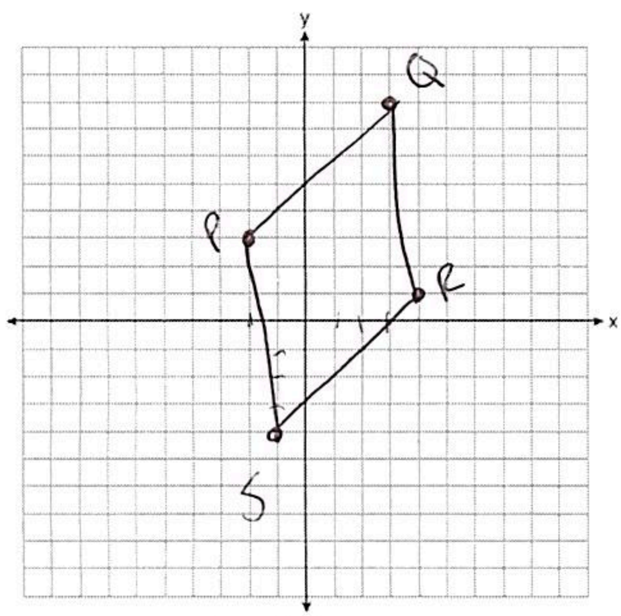
$\overline{AF} = \sqrt{(0--6)^2+(-2-2)^2} = \sqrt{36}$

$\overline{AE} = \sqrt{125}$

$\overline{DF} = \sqrt{29}$

CONCLUSION: ADEF is a ▱ b/c opp. sides are ≅ but diagonals are not
ADEF is not a rhombus b/c all sides are not ≅

2) Quadrilateral *PQRS* has vertices $P(-2,3)$, $Q(3,8)$, $R(4,1)$, and $S(-1,-4)$. Prove that *PQRS* is a rhombus. Prove that *PQRS* is *not* a square. [The use of the set of axes below is optional.]



$\overline{PQ} = \sqrt{(3-2)^2+(8-3)^2} = \sqrt{50}$

$\overline{QR} = \sqrt{(4-3)^2+(1-8)^2} = \sqrt{50}$

$\overline{RS} = \sqrt{(-1-4)^2+(-4-1)^2} = \sqrt{50}$

$\overline{PS} = \sqrt{(-1--2)^2+(-4-3)^2} = \sqrt{50}$

$\overline{PR} = \sqrt{(4--2)^2+(1-3)^2} = \sqrt{40}$

$\overline{QS} = \sqrt{(-1-3)^2+(-4-8)^2} = \sqrt{160}$

CONCLUSION: PQRS is a rhombus b/c all sides are ≅
but not a square b/c diagonals are not ≅