Name _____ Period: _____ Date_____

Lesson 8: Coordinate Geometry Proofs

Classwork

1. Prove that quadrilateral $LEAP$ with the vertices $L(-3,1), E(2,6), A(9,5)$ *and* $P(4,0)$ is a parallelogram.

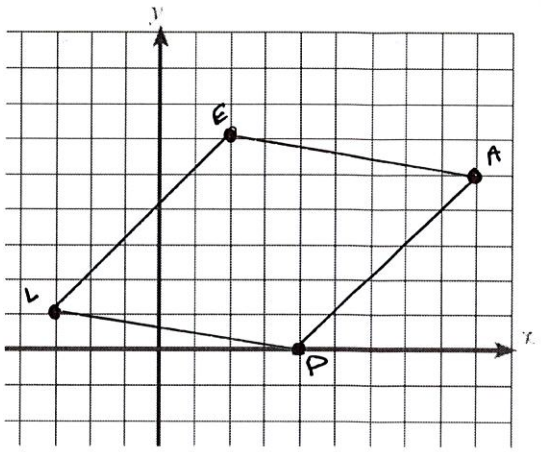
$m_{EA} = \frac{-1}{7}$ Slope EA ∥ Slope LP

$m_{LP} = \frac{-1}{7}$ $\overline{EA} \cong \overline{LP}$

$\therefore \square LEAP$

$m\overline{EA} = \sqrt{(2-9)^2 + (6-5)^2} = \sqrt{50}$

$m\overline{LP} = \sqrt{(-3-4)^2 + (1-0)^2} = \sqrt{50}$



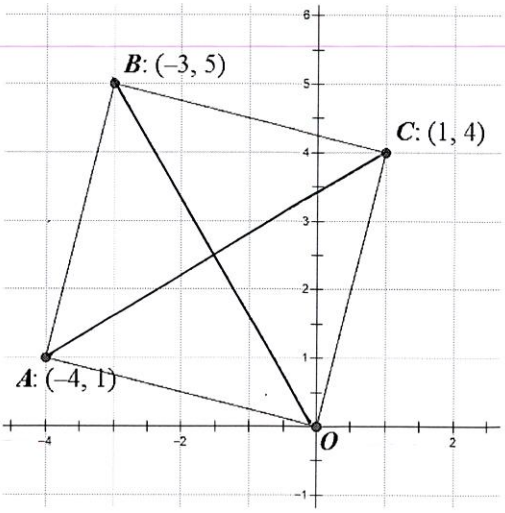
2. The points $O(0,0), A(-4,1), B(-3,5)$, and $C(1,4)$ are the vertices of parallelogram $OABC$. Is this parallelogram a rectangle? Support you answer.

$M_{AB} = 4$ $\overline{AB} \perp \overline{BC}$

$M_{BC} = \frac{-1}{4}$ $\overline{BD} \cong \overline{AC}$

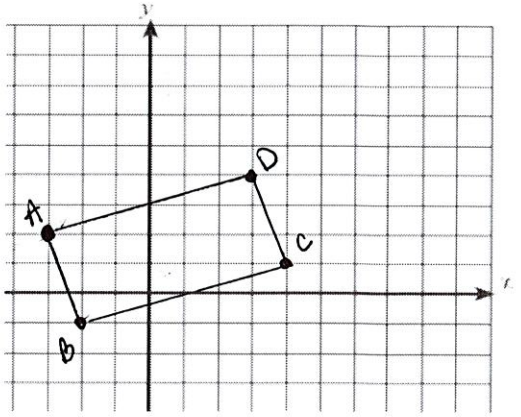
$m\overline{BO} = \sqrt{(-3-0)^2 + (5-0)^2} = \sqrt{34}$

$m\overline{AC} = \sqrt{(-4-1)^2 + (1-4)^2} = \sqrt{34}$



3. The coordinates of the vertices of parallelogram $ABCD$ are $A(-3,2), B(-2,-1), C(4,1)$ *and* $D(3,4)$. The slopes of which line segments could be calculated to show that *ABCD* is a rectangle?

1) $\overline{AB}$ and $\overline{DC}$
2) $\overline{AB}$ and $\overline{BC}$ → shows 90° angles
3) $\overline{AD}$ and $\overline{BC}$
4) $\overline{AC}$ and $\overline{BD}$



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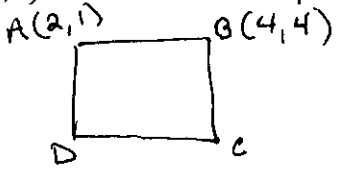
4. The coordinates of two vertices of square $ABCD$ are $A(2,1)$ and $B(4,4)$. Determine the slope of side $\overline{BC}$.



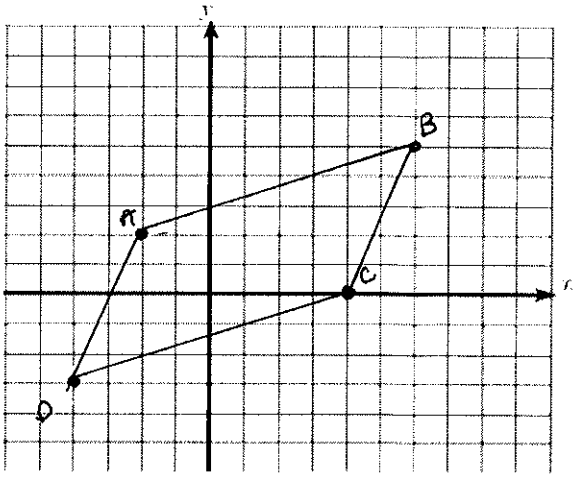
$m\overline{AB} = \frac{4-1}{4-2} = \frac{3}{2}$

$m\overline{BC} = -2/3$

5. Given: $A(-2,2), B(6,5), C(4,0), and\ D(-4,-3)$.
Prove: $ABCD$ is a parallelogram but ***not*** a rectangle.
[The use of the grid is optional.]

$m\overline{AD} = 5/2$ $m\overline{AD} \neq m\overline{AB}$

$m\overline{AB} = 3/8$



6. Quadrilateral $ABCD$ has vertices $A(2,3), B(7,10), C(9,4), and\ D(4,-3)$. Prove that $ABCD$ is a parallelogram.

$m\overline{AB} = 7/5$

$m\overline{DC} = 7/5$

$\overline{AB} \parallel \overline{DC}$

$\overline{AB} \cong \overline{DC}$

$\therefore$ parallelogram

$M\overline{AB} = \sqrt{(2-7)^2 + (3-10)^2} = \sqrt{74}$

$M\overline{DC} = \sqrt{(9-4)^2 + (4--3)^2} = \sqrt{74}$