

Name: Key

Date: _____

Coordinate Geometry Proofs using Slope and Distance

1. The vertices of triangle JEN are J(2, 10), E(6, 4), and N(12, 8). Prove that JEN is an isosceles right triangle.

1. How do you prove it is isosceles? distance

$$JE = \sqrt{52} \\ = 2\sqrt{13}$$

$$EN = \sqrt{52} \\ = 2\sqrt{13}$$

$$NJ = \sqrt{80} \\ = 4\sqrt{5}$$

2. How do you prove it is a right triangle? slope

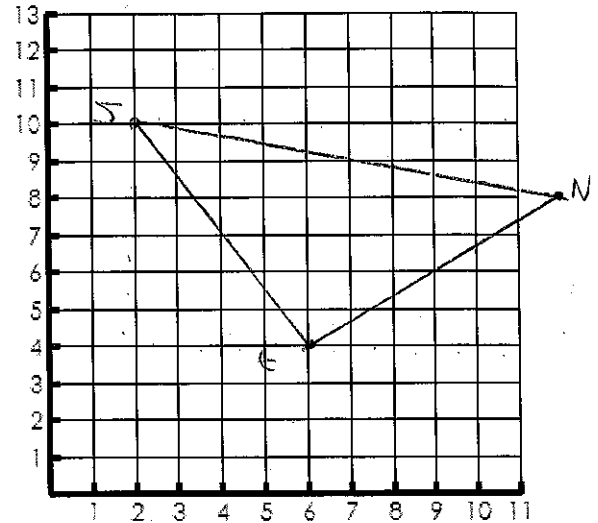
$$JE = -3/2$$

$$EN = 2/3$$

$$NJ = -1/5$$

3. Is JEN an isosceles right triangle? How do you know?

Yes - JE + EN are congruent + \perp .



2. A parallelogram has opposite sides congruent and parallel. The vertices of quadrilateral JOHN are J(-3, 1), O(3, 3), H(5, 7), and N(-1, 5). Prove that JOHN is a parallelogram.

1. How do you prove opposite sides are congruent?

distance

$$JO = 2\sqrt{10}$$

$$HN = 2\sqrt{10}$$

$$OH = 2\sqrt{5}$$

$$NJ = 2\sqrt{5}$$

2. How do you prove opposite sides are parallel?

slopes

$$JO = 1/3$$

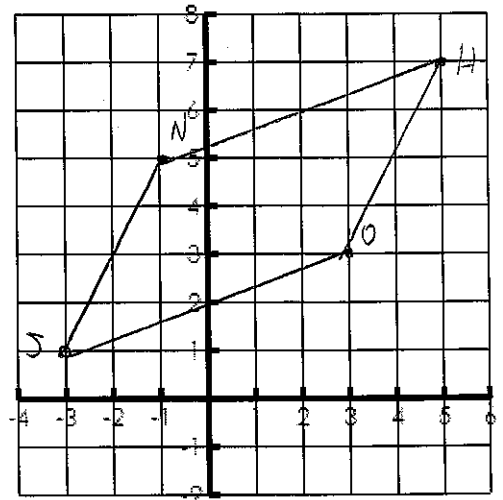
$$HN = 1/3$$

$$OH = 2$$

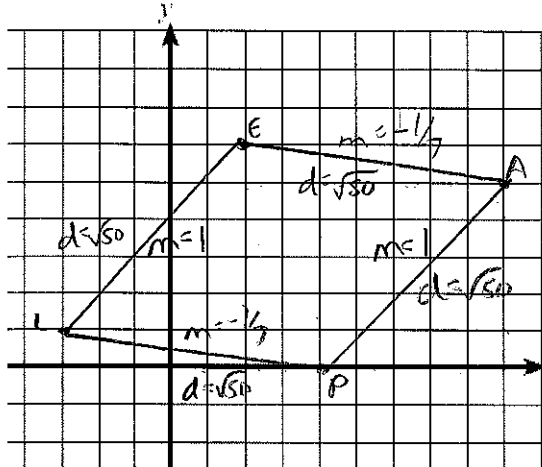
$$NJ = 2$$

3. Is JOHN a parallelogram? How do you know?

Yes - opposite side are parallel + congruent



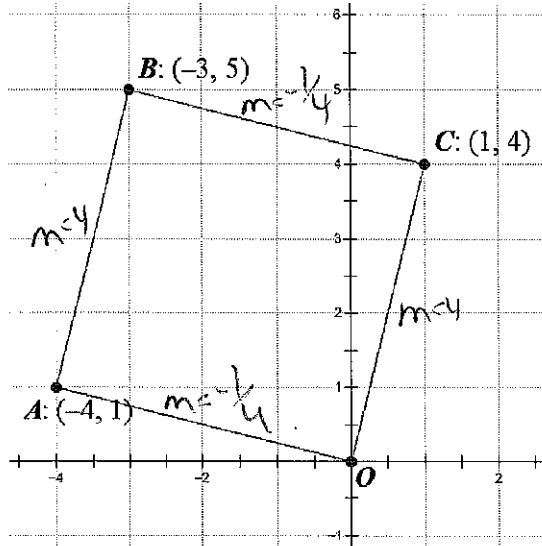
3. Prove that quadrilateral $LEAP$ with the vertices $L(-3,1), E(2,6), A(9,5)$ and $P(4,0)$ is a parallelogram.



opp. sides are parallel + congruent.

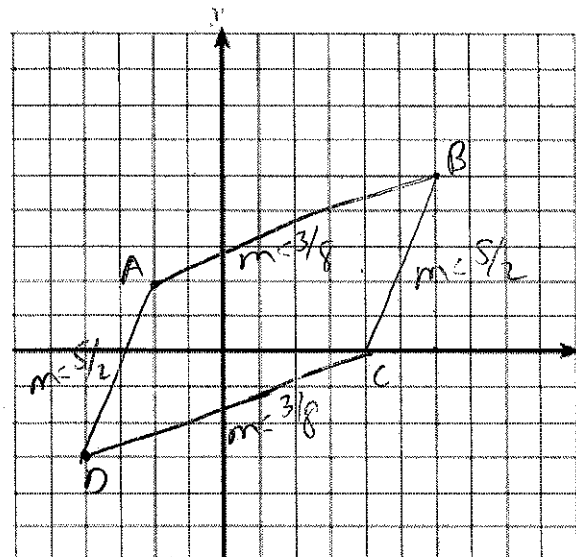
Does it have another name? rhombus

4. 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.



Yes, 4 right angles

5. Given: $A(-2,2), B(6,5), C(4,0)$, and $D(-4,-3)$. Prove: $ABCD$ is a parallelogram but not a rectangle.



- does not have 4 right angles or congruent diagonals.