

Day 6 – Proving All Parallelograms

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

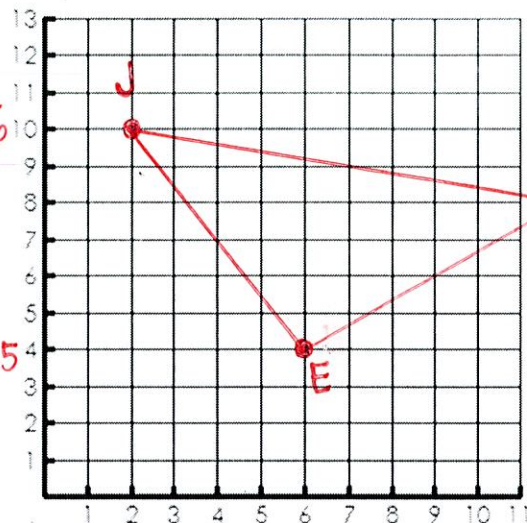
$JE = \sqrt{52}$ or $2\sqrt{13}$ $EN = \sqrt{52}$ or $2\sqrt{13}$ $NJ = \sqrt{104}$ or $2\sqrt{26}$

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

$JE = -6/4 = -3/2$ $EN = 4/6 = 2/3$ $NJ = 2/-10 = 1/-5$

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

Yes, because JE and EN are congruent and perpendicular



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

$JO = \sqrt{40}$ or $2\sqrt{10}$ $HN = \sqrt{40}$ or $2\sqrt{10}$

$OH = \sqrt{20}$ or $2\sqrt{5}$ $NJ = \sqrt{20}$ or $2\sqrt{5}$

2. How do you prove opposite sides are parallel?

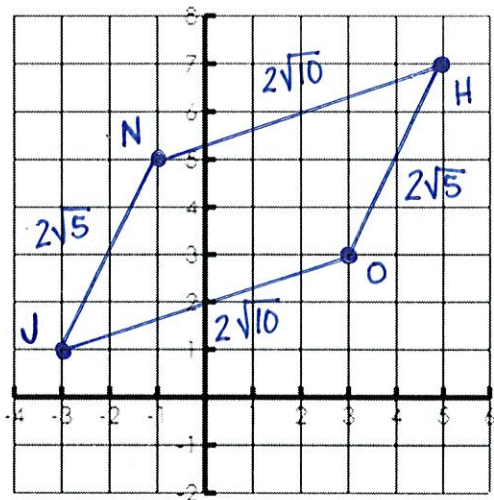
slopes

$JO = \frac{2}{6} = \frac{1}{3}$ $HN = \frac{-2}{-6} = \frac{1}{3}$

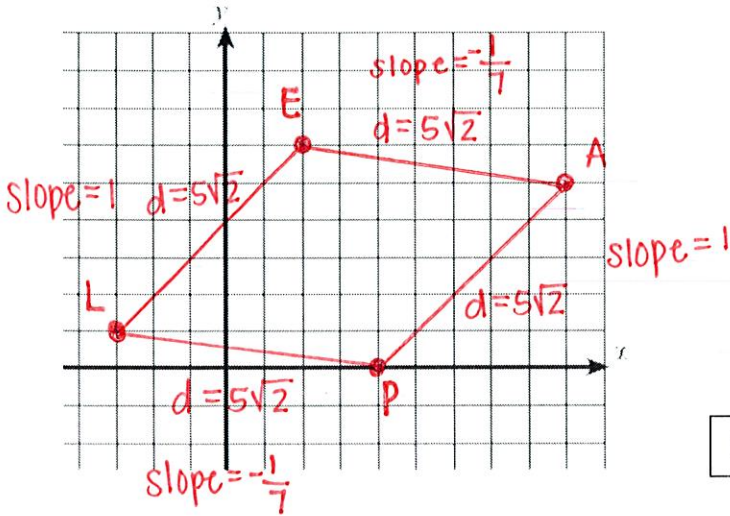
$OH = \frac{4}{2} = 2$ $NJ = \frac{-4}{-2} = 2$

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

Yes, opposite sides are parallel and congruent



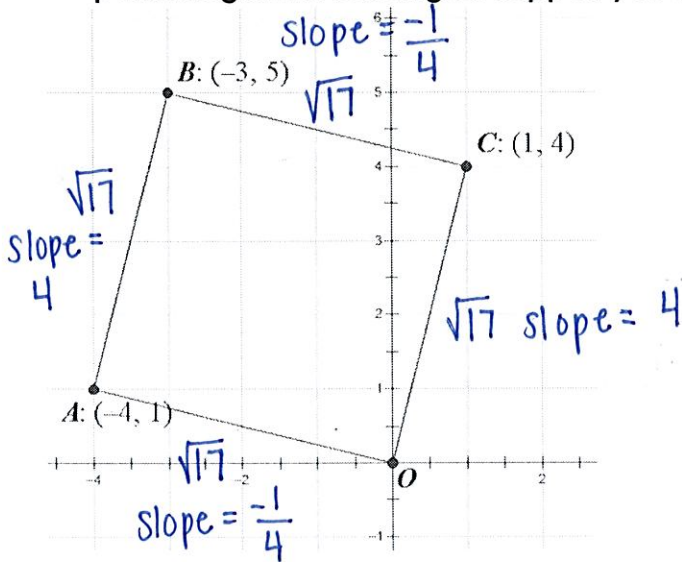
3. Prove that quadrilateral $LEAP$ with the vertices $L(-3,1), E(2,6), A(9,5)$ and $P(4,0)$ is a parallelogram.



All sides are congruent and opposite sides are parallel

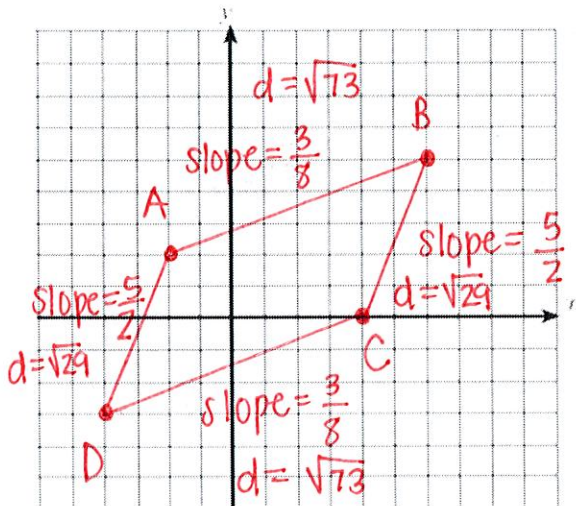
Does it have another name? Rhombus

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 your answer.



This a rectangle. Opposite sides are parallel and congruent and there are four right angles (opposite reciprocal slopes at each vertex).

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



opposite sides are parallel and congruent, but $ABCD$ does not have four right angles.