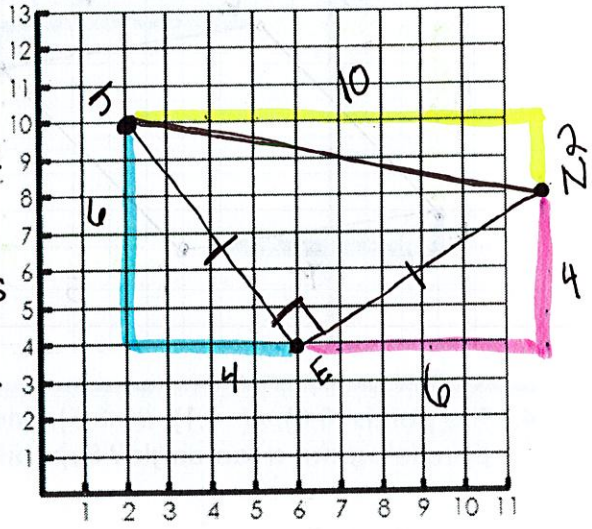
Name: _____ Date: _____

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? $2 \cong$ sides

JE= $6^2+4^2=c^2$ EN= $6^2+4^2=c^2$ NJ= $10^2+2^2=c^2$

JE = 7.2 EN = 7.2 NJ = 10.2

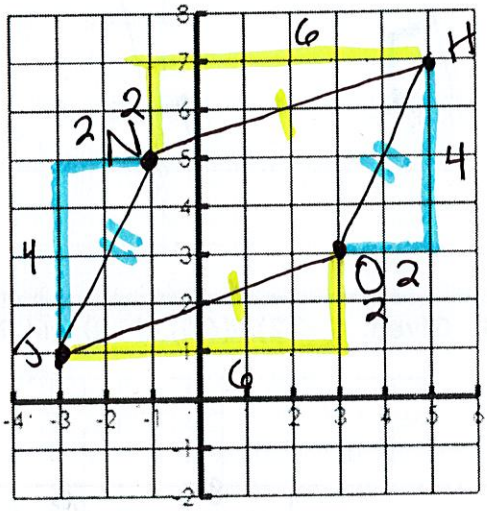
2. How do you prove it is a right triangle? opp. rec. slopes

JE= $\frac{-6}{4}$ $-\frac{3}{2}$ EN= $\frac{4}{6}=\frac{2}{3}$ NJ= $\frac{-2}{10}=\frac{-1}{5}$

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

yes, JE $\cong$ EN & JE $\perp$ EN

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 / pythagorean

JO= $2^2+6^2=c^2$, $c=6.3$ HN= $6^2+2^2=c^2$, $c=6.3$

OH= $2^2+4^2=c^2$, $c=4.5$ NJ= $4^2+2^2=c^2$, $c=4.5$

2. How do you prove opposite sides are parallel? slope $\Rightarrow$ same

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

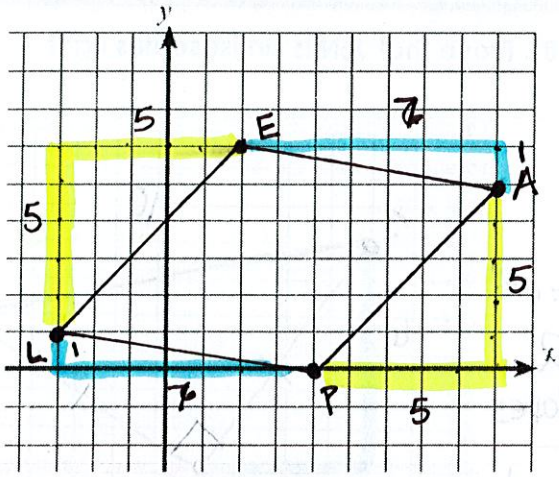
OH= $\frac{4}{2}=2$ NJ= $\frac{4}{2}=2$

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

yes, [JO $\cong$ HN and OH $\cong$ NJ

[AND JO // HN and OH // NJ

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



length: EA = 7.1 LE 7.1

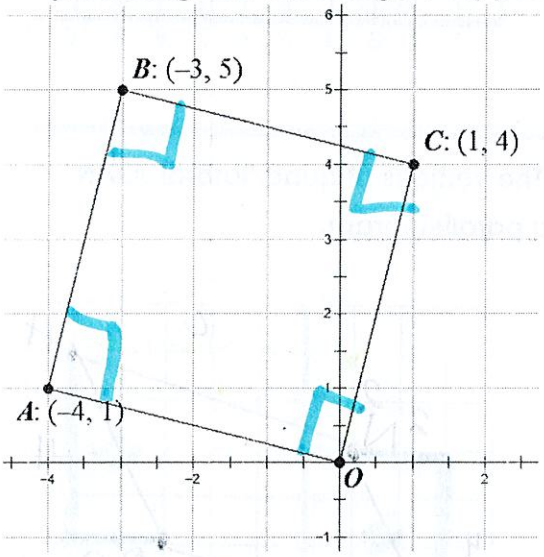
LP = 7.1 PA = 7.1

Slope: EA = $-\frac{1}{5}$ LE = 1

LP = $-\frac{1}{5}$ PA = 1

Does it have another name? rhombus

4. The points (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.

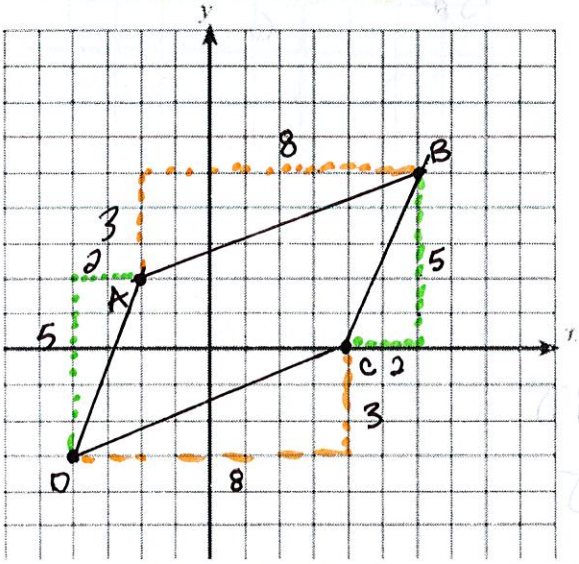


Slope:

mBC = $-\frac{1}{4}$ mAB = 4

mOC = 4 mAO = $-\frac{1}{4}$

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



mAB: $\frac{3}{8}$ mOA: $\frac{5}{2}$

mOC: $\frac{3}{8}$ mBC: $\frac{5}{2}$