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Date ____________
Geometry

Coordinate Geometry Not Proofs

1. Prove that the triangle whose vertices are A(-6,6), B(-5,2), and C(3,4) is a right triangle but *not* isosceles.

1) ABC is a right triangle because its sides fit into Pythagorean theorem. It is not isosceles because it does not have two congruent sides.

2) $d\overline{AB} = \sqrt{1^2+4^2} = \sqrt{1+16} = \sqrt{17}$

$d\overline{BC} = \sqrt{2^2+8^2} = \sqrt{4+64} = \sqrt{68}$

$d\overline{AC} = \sqrt{9^2+2^2} = \sqrt{81+4} = \sqrt{85}$

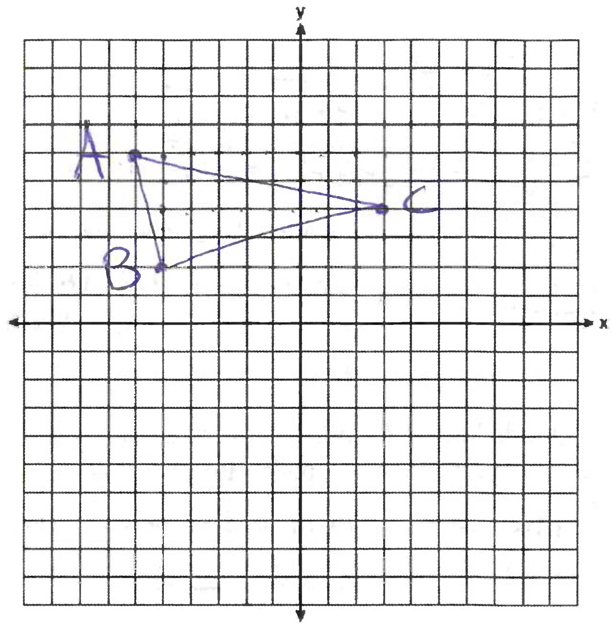
3) $a^2+b^2=c^2$

$\sqrt{17}^2+\sqrt{68}^2 \stackrel{?}{=} \sqrt{85}^2$

$17+68=85$

$85=85$ ✓

$\overline{AB} \not\cong \overline{BC} \not\cong \overline{AC}$ because they don't have the same distance.



2. Quadrilateral *FRDY* has vertices F(-2, -8), R(7,-1), D(10,10) and Y(1,3). Using coordinate geometry, prove that quadrilateral *FRDY* is a rhombus but *not* a square.

1) FRDY is a rhombus because all sides are congruent. It is not a square because the diagonals are not congruent.

2) $d\overline{FY} = \sqrt{3^2+11^2} = \sqrt{9+121} = \sqrt{130}$

$d\overline{YD} = \sqrt{9^2+7^2} = \sqrt{81+49} = \sqrt{130}$

$d\overline{DR} = \sqrt{3^2+11^2} = \sqrt{9+121} = \sqrt{130}$

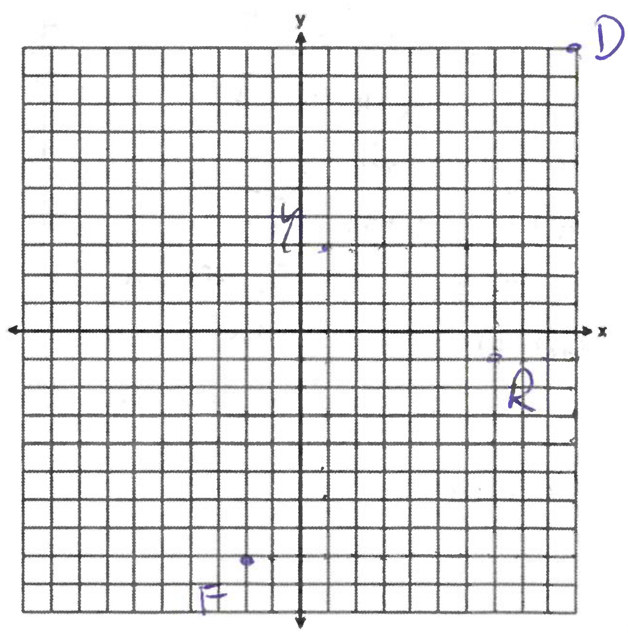
$d\overline{RF} = \sqrt{9^2+7^2} = \sqrt{81+49} = \sqrt{130}$

$d\overline{YR} = \sqrt{6^2+4^2} = \sqrt{36+16} = \sqrt{52}$

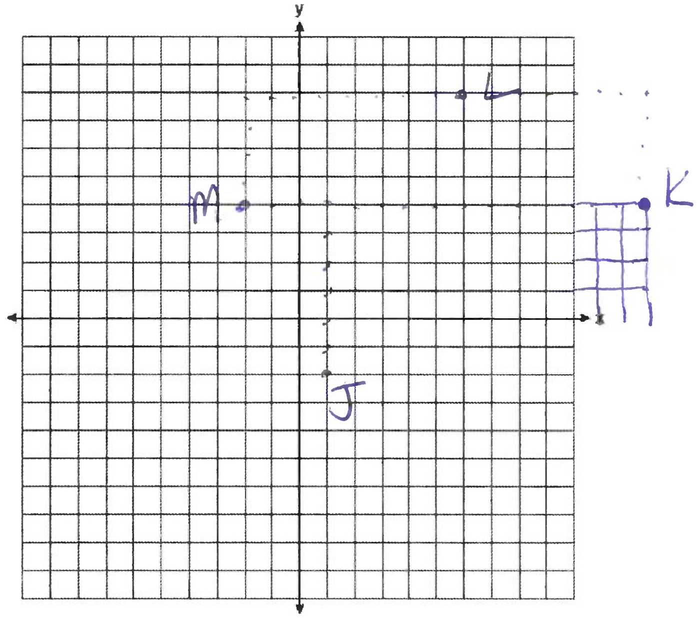
$d\overline{FD} = \sqrt{12^2+18^2} = \sqrt{144+324} = \sqrt{468}$

3) $\overline{FR} \cong \overline{RD} \cong \overline{DY} \cong \overline{YF}$ because they have the same distance

$\overline{YR} \not\cong \overline{DF}$ because they don't have the same distance



3. The coordinates of quadrilateral JKLM are J(1,-2), K(13,4), L(6,8), and M(-2,4). Prove that quadrilateral JKLM is a trapezoid but not an isosceles trapezoid.



1) JKLM is a trapezoid because it has 1 pair of opposite sides parallel. It is not isosceles because it does not have congruent legs.

2) $m\ \overline{ML} = \frac{4}{8} = \frac{1}{2}$

$m\ \overline{JK} = \frac{6}{12} = \frac{1}{2}$

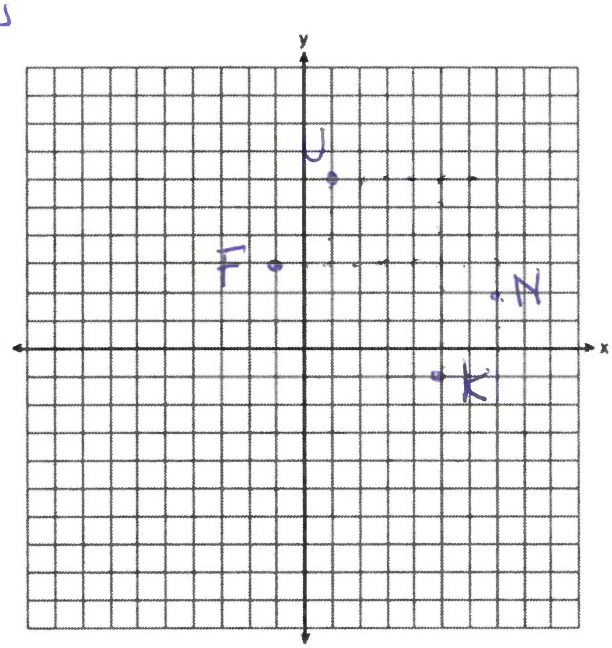
$d\ \overline{MJ} = \sqrt{3^2+6^2} = \sqrt{9+36} = \sqrt{45}$

$d\ \overline{LK} = \sqrt{7^2+4^2} = \sqrt{49+16} = \sqrt{65}$

3) $\overline{ML} \parallel \overline{JK}$ because they have the same slope

$\overline{MJ} \not\cong \overline{LK}$ because they don't have the same distance

4. Quadrilateral *FUNK* has vertices F(-1, 3), U(1,6), N(7,2) and K(5,-1). Using coordinate geometry, prove that quadrilateral *FUNK* is a rectangle but *not* a square.



1) FUNK is a rectangle because it has 2 pairs of opposite sides ≅ and diagonals ≅. It is not a square because not all sides are congruent.

2) $d\overline{FU} = \sqrt{2^2+3^2} = \sqrt{4+9} = \sqrt{13}$

$d\overline{UN} = \sqrt{6^2+4^2} = \sqrt{36+16} = \sqrt{52}$

$d\overline{NK} = \sqrt{2^2+3^2} = \sqrt{4+9} = \sqrt{13}$

$d\overline{KF} = \sqrt{6^2+4^2} = \sqrt{36+16} = \sqrt{52}$

$d\overline{FN} = \sqrt{8^2+1^2} = \sqrt{64+1} = \sqrt{65}$

$d\overline{UK} = \sqrt{4^2+7^2} = \sqrt{16+49} = \sqrt{65}$

3) $\overline{FU} \cong \overline{KN}$, $\overline{FK} \cong \overline{UN}$, $\overline{FN} \cong \overline{UK}$ because they have the same distance

$\overline{FU} \not\cong \overline{UN}$ because they don't have the same distance