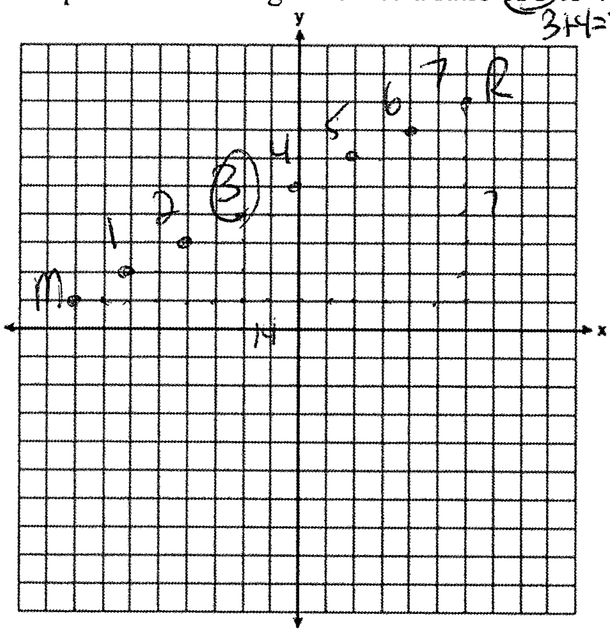
Name Schlansky
Mr. Schlansky

Date ____________
Geometry

Coordinate Geometry Review Sheet

1. What are the coordinates of the point on the directed line segment from $M(-8,1)$ to $R(6,8)$ that partitions the segment into a ratio of 3 to 4?

$3+4=7$



$\frac{\Delta x}{p}$ $\frac{\Delta y}{p}$

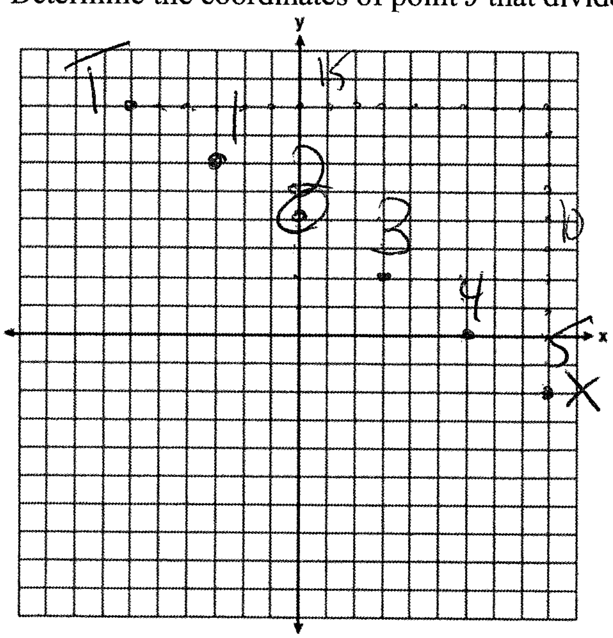
$\frac{14}{7}$ $\frac{7}{7}$

2 1

(-2,4)

2. Directed line segment TX has endpoints whose coordinates are $T(-6,8)$ and $X(9,-2)$. Determine the coordinates of point J that divides the segment in the ratio 2 to 3.

$2+3=5$



$\frac{\Delta x}{p}$ $\frac{\Delta y}{p}$

$\frac{15}{5}$ $\frac{10}{5}$

3 2

(0,4)

3. Write an equation of the perpendicular bisector of the line segment whose endpoints are (3,5) and (5,9).

1) $y+7=-\frac{1}{2}(x+4)$
2) $y+7=2(x+4)$
3) $y-7=-\frac{1}{2}(x-4)$
4) $y-7=2(x-4)$

$m=\frac{\Delta y}{\Delta x}$ $mp=\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}$

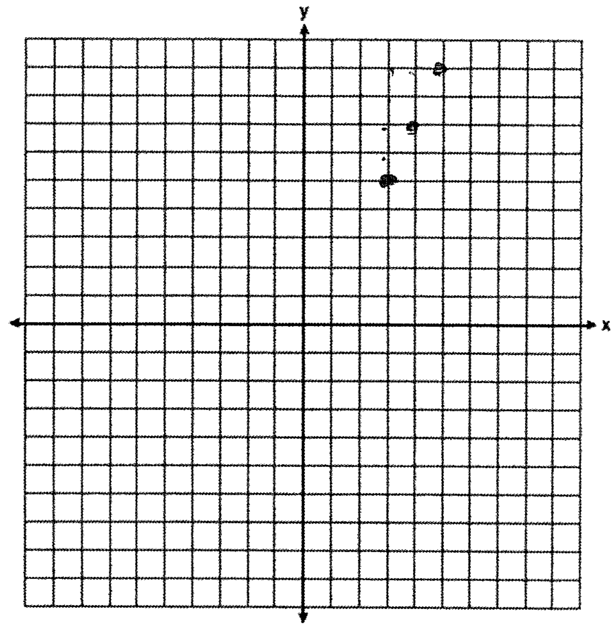
$m=\frac{4}{2}$ $mp=\frac{3+5}{2},\frac{5+9}{2}$

$m=2$ $(4,7)$

$m\perp=\frac{-1}{2}$ $y-y_1=m(x-x_1)$

$x_1=4$ $y-7=-\frac{1}{2}(x-4)$

$y_1=7$



4. Write an equation of the perpendicular bisector of the line segment whose endpoints are (-1,5) and (1,1).

1) $y-3=\frac{1}{2}x$
2) $y+3=\frac{1}{2}x$
3) $y-3=-2x$
4) $y+3=-2x$

$m=\frac{\Delta y}{\Delta x}$ $mp=\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}$

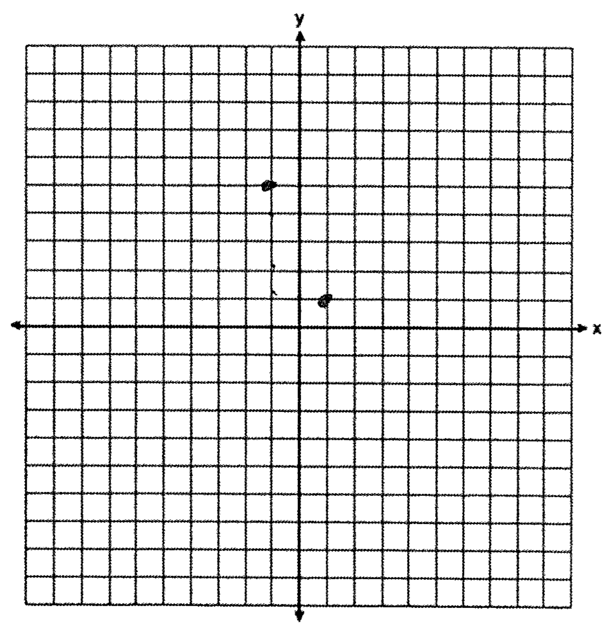
$m=\frac{-4}{2}$ $mp=\frac{-1+1}{2},\frac{5+1}{2}$

$m=-2$ $(0,3)$

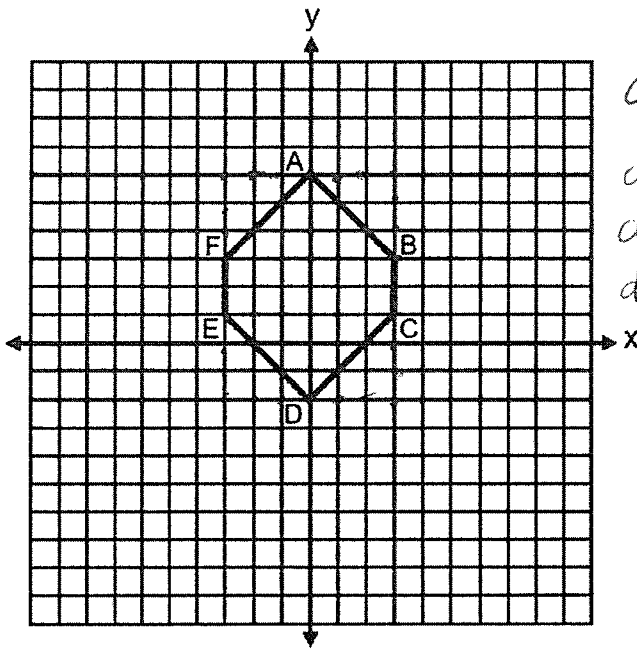
$m\perp=\frac{1}{2}$ $y-y_1=m(x-x_1)$

$x_1=0$ $y-3=\frac{1}{2}(x-0)$

$y_1=3$ $y-3=\frac{1}{2}x$



5.



$d\overline{AB} = \sqrt{3^2+3^2} = \sqrt{9+9} = \sqrt{18}$

$d\overline{BC} = 2$

$d\overline{CD} = \sqrt{3^2+3^2} = \sqrt{9+9} = \sqrt{18}$

$d\overline{DE} = \sqrt{3^2+3^2} = \sqrt{9+9} = \sqrt{18}$

$d\overline{EF} = 2$

$d\overline{FA} = \sqrt{3^2+3^2} = \sqrt{9+9} = \sqrt{18}$

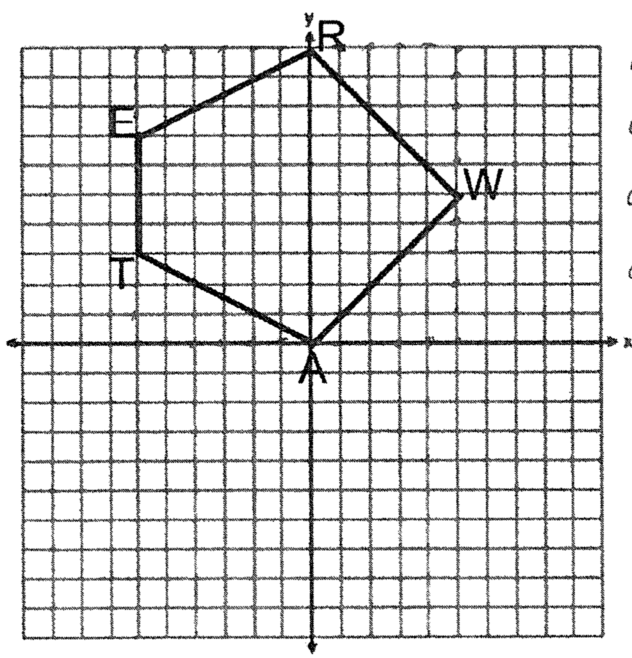
$4\sqrt{18} + 4$

$4\sqrt{9}\sqrt{2} + 4$

$4(3)\sqrt{2} + 4$

$12\sqrt{2} + 4$

6.



$d\overline{RW} = \sqrt{5^2+5^2} = \sqrt{25+25} = \sqrt{50}$

$d\overline{WA} = \sqrt{5^2+5^2} = \sqrt{25+25} = \sqrt{50}$

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

$d\overline{TE} = 4$

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

$2\sqrt{50} + 2\sqrt{45} + 4$

$2\sqrt{25}\sqrt{2} \quad 2\sqrt{9}\sqrt{5}$

$2(5)\sqrt{2} + 2(3)\sqrt{5} + 4$

$10\sqrt{2} + 6\sqrt{5} + 4$

7~~3~~. Given $C(-7,-3)$, $A(-7,2)$, $M(-1,5)$, $I(3,2)$. Prove $CAMI$ is an isosceles trapezoid.

1) CAMI is an isosceles trapezoid because it has 1 pair of opposite sides parallel and it has congruent legs.

2) $m\overline{AM} = \frac{3}{6} = \frac{1}{2}$

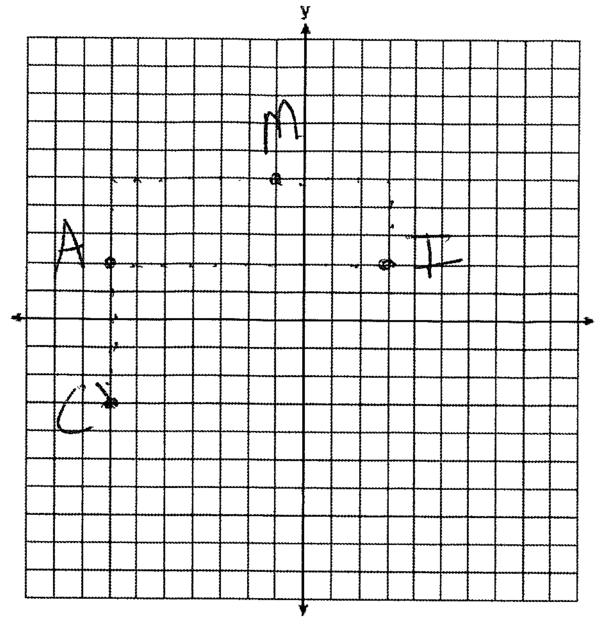
$mCI = \frac{5}{10} = \frac{1}{2}$

$d\overline{AC} = 5$

$d\overline{MI} = \sqrt{4^2+3^2} = \sqrt{16+9} = \sqrt{25} = 5$

3) $\overline{AM} \parallel \overline{CI}$ because they have the same slope

$\overline{AC} \cong \overline{MI}$ because they have the same distance



8~~4~~. Given $M(-5,7)$, $I(-1,10)$, $L(9,5)$, $O(-3,-4)$. Prove $MILO$ is an isosceles trapezoid.

1) MILO is an isosceles trapezoid because it has 1 pair of opposite sides parallel and congruent legs.

2) $m\overline{MI} = \frac{3}{4}$

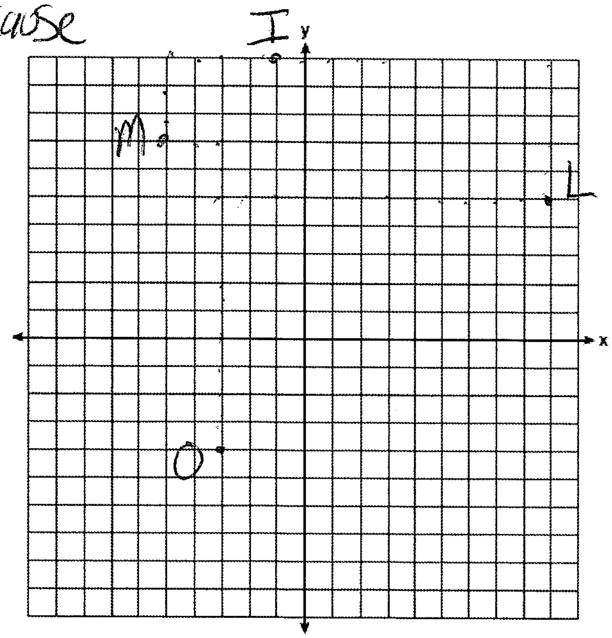
$m\overline{OL} = \frac{9}{12} = \frac{3}{4}$

$d\overline{MO} = \sqrt{2^2+11^2} = \sqrt{4+121} = \sqrt{125}$

$d\overline{IL} = \sqrt{10^2+5^2} = \sqrt{100+25} = \sqrt{125}$

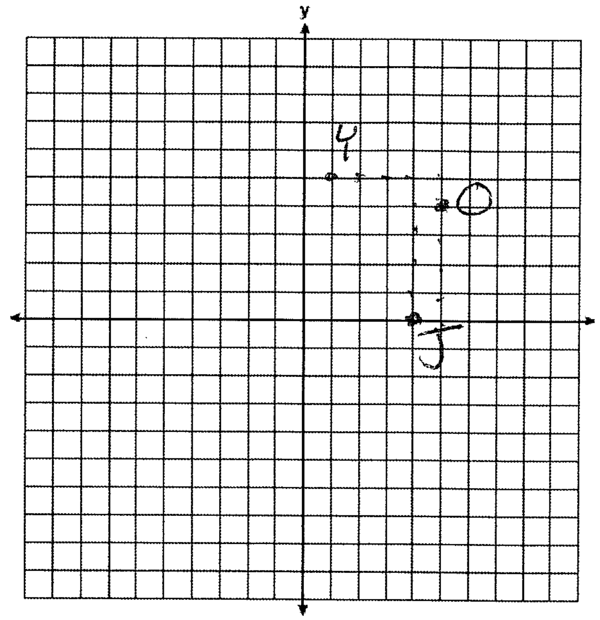
3) $\overline{MI} \parallel \overline{OL}$ because they have the same slope

$\overline{MO} \cong \overline{IL}$ because they have the same distance.



9. Triangle JOY has vertices J(4,0), O(5,4) and Y(1,5). Prove that JOY is an isosceles right triangle.

1) JOY is an isosceles right triangle because it has two congruent sides and its sides fit into Pythagolean Theorem.



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

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

$d\overline{JY} = \sqrt{3^2+5^2} = \sqrt{9+25} = \sqrt{34}$

3) $\overline{JO} \cong \overline{OY}$ because they have the same distance.

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

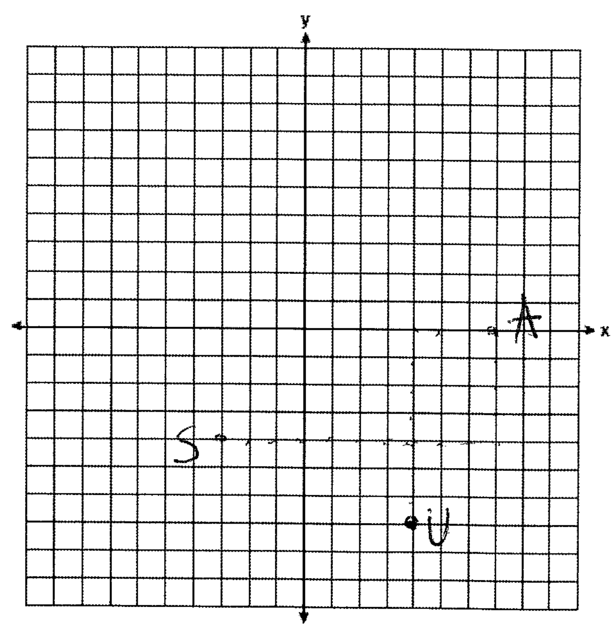
$\sqrt{17}^2+\sqrt{17}^2=\sqrt{34}^2$

$17+17=34$

$34=34$ ✓

10. Triangle USA has vertices U(4,-7), S(-3,-4), and A(7,0). Prove that triangle USA is an isosceles right triangle.

1) USA is an isosceles right triangle because it has two congruent sides and its sides fit into Pythagolean theolem



2) $d\overline{SU} = \sqrt{7^2+3^2} = \sqrt{49+9} = \sqrt{58}$

$d\overline{UA} = \sqrt{7^2+3^2} = \sqrt{49+9} = \sqrt{58}$

$d\overline{SA} = \sqrt{10^2+4^2} = \sqrt{100+16} = \sqrt{116}$

3) $\overline{SU} \cong \overline{UA}$ because they have the same distance

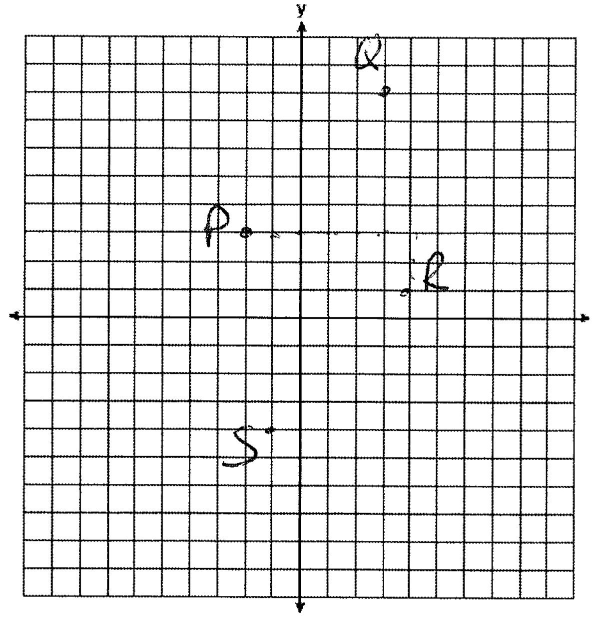
$a^2+b^2=c^2$

$\sqrt{58}^2+\sqrt{58}^2=\sqrt{116}^2$

$58+58=116$

$116=116$ ✓

11. Quadrilateral *PQRS* has vertices $P(-2,3)$, $Q(3,8)$, $R(4,1)$, and $S(-1,-4)$. Prove that *PQRS* is a rhombus. Prove that *PQRS* is *not* a square.



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

2) $d\overline{PQ} = \sqrt{5^2+5^2} = \sqrt{25+25} = \sqrt{50}$

$d\overline{QR} = \sqrt{1^2+7^2} = \sqrt{1+49} = \sqrt{50}$

$d\overline{RS} = \sqrt{5^2+5^2} = \sqrt{25+25} = \sqrt{50}$

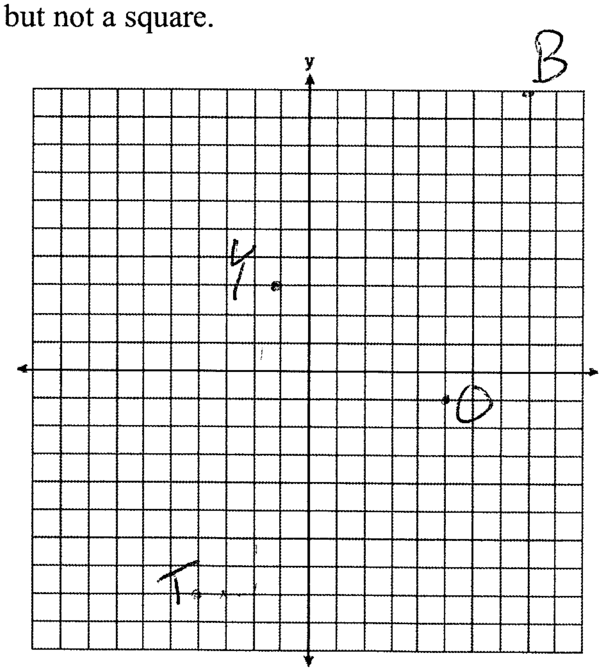
$d\overline{SP} = \sqrt{1^2+7^2} = \sqrt{1+49} = \sqrt{50}$

$d\overline{PR} = \sqrt{6^2+2^2} = \sqrt{36+4} = \sqrt{40}$

$d\overline{QS} = \sqrt{4^2+12^2} = \sqrt{16+144} = \sqrt{160}$

3) $\overline{PQ} \cong \overline{QR} \cong \overline{RS} \cong \overline{SP}$ because they have the same distance. $\overline{PR} \cong \overline{QS}$ because they don't have the same distance.

12. Quadrilateral *TOBY* has vertices T(-4, -8), O(5,-1), B(8,10) and Y(-1,3). Using coordinate geometry, prove that quadrilateral *TOBY* is a rhombus but not a square.



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

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

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

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

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

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

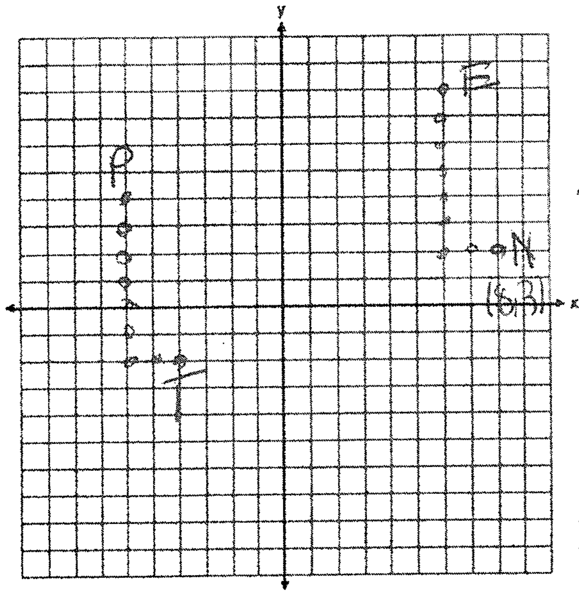
$d\overline{TB} = \sqrt{12^2+18^2} = \sqrt{144+324} = \sqrt{468}$

3) $\overline{TY} \cong \overline{YB} \cong \overline{BO} \cong \overline{OT}$ because they have the same distance.

$\overline{YO} \ncong \overline{TB}$ because they don't have the same distance.

You can just find the 4th po
previous page by counting!

13 & 14. Triangle PET has vertices with coordinates $P(-6,4)$, $E(6,8)$, and $T(-4,-2)$. Prove $\triangle PET$ is a right triangle. State the coordinates of N, the image of P, after a 180° rotation centered at (1, 3). Prove $PENT$ is a rectangle. [The use of the set of axes below is optional.]



1) $\triangle PET$ is a right triangle because its sides fit into Pythagorean theorem.

2) $d\overline{PE} = \sqrt{12^2+4^2} = \sqrt{144+16} = \sqrt{160}$

$d\overline{ET} = \sqrt{10^2+10^2} = \sqrt{100+100} = \sqrt{200}$

$d\overline{TP} = \sqrt{2^2+6^2} = \sqrt{4+36} = \sqrt{40}$

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

$\sqrt{40}^2+\sqrt{160}^2 = \sqrt{200}^2$

$40+160=200$

$200=200$

1) PENT is a rectangle because it has two pairs of opposite sides congruent and diagonals congruent.

2) $d\overline{TN} = \sqrt{12^2+4^2} = \sqrt{144+16} = \sqrt{160}$

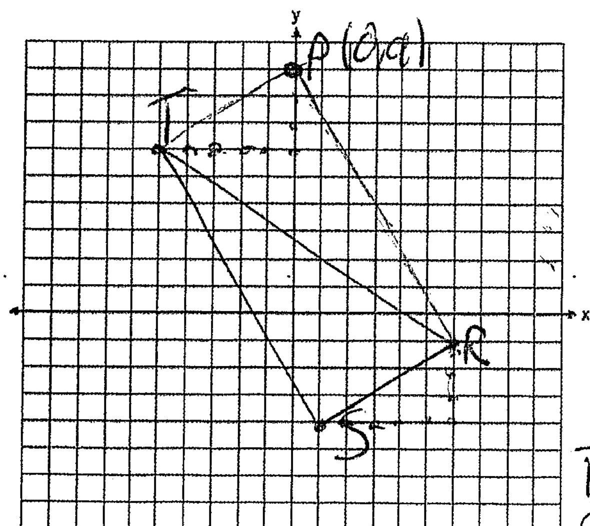
$d\overline{EN} = \sqrt{2^2+6^2} = \sqrt{4+36} = \sqrt{40}$

$d\overline{PN} = \sqrt{14^2+2^2} = \sqrt{196+4} = \sqrt{200}$

3) $\overline{PE} \cong \overline{TN}$, $\overline{PT} \cong \overline{EN}$, $\overline{PN} \cong \overline{TE}$ because they have the same distance

~~195~~ ~~193~~

14 9. In the coordinate plane, the vertices of $\triangle RST$ are $R(6,-1)$, $S(1,-4)$, and $T(-5,6)$. Prove that $\triangle RST$ is a right triangle. State the coordinates of point P such that quadrilateral $RSTP$ is a rectangle. Prove that your quadrilateral $RSTP$ is a rectangle. [The use of the set of axes below is optional.]



1) $\triangle RST$ is a right triangle because its sides fit into Pythagorean Theorem

2) $d\overline{RS} = \sqrt{5^2+3^2} = \sqrt{25+9} = \sqrt{34}$

$d\overline{ST} = \sqrt{6^2+10^2} = \sqrt{36+100} = \sqrt{136}$

$d\overline{TR} = \sqrt{11^2+7^2} = \sqrt{121+49} = \sqrt{170}$

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

$\sqrt{34}^2+\sqrt{136}^2 = \sqrt{170}^2$

$170=170$

1) RSTP is a rectangle because it has 2 pairs of opposite sides congruent and diagonals congruent

2) $d\overline{TP} = \sqrt{5^2+3^2} = \sqrt{25+9} = \sqrt{34}$

$d\overline{PR} = \sqrt{6^2+10^2} = \sqrt{36+100} = \sqrt{136}$

$d\overline{PS} = \sqrt{1^2+13^2} = \sqrt{1+169} = \sqrt{170}$

3) $\overline{RS} \cong \overline{TP}$, $\overline{ST} \cong \overline{PR}$, $\overline{TR} \cong \overline{PS}$ because they have the same distance