Name (print first and last) _____ **Per**_____ **Date:** 9/11 due 9/12

#4 Triangles & midpoints with a compass. **Geometry Regents 2013-2014 Ms. Lomac**

SLO: I can use a paper compass to copy points and segments to maintain distance and construct triangles.

(1) Draw: a) $\overrightarrow{QM}$ on $\overleftarrow{NM}$ b) $\overleftrightarrow{AB}$ intersecting $\overline{CD}$ at E

(2) Words that we will use today are listed below. Non-bolded words should be in your notes already. Bold words will be added to your notes today. If you are absent for notes, several Geometry glossary links are on Ms. Lomac's website that you can use to define, draw examples, name & write notation, and draw non-examples.

location	direction	position	distance (length)	relationships
point	line	ray	line segment	endpoint
congruent	compass	construction	transform	translate
midpoint	**bisect**	**perpendicular**	**equilateral**	**isosceles**
scalene				

(3) Quick recap of what we know so far:

a) The 5 main concepts in Geometry are (hint: see notes on Geometry):

_____, _____, _____, _____, _____

b) Points are _____ represented in drawings by _____

c) When we have 2 points, we can use a _____ to measure the _____ between them (also known as the length of the segment that connects the points)

d) When we make a congruent copy of a point or segment, we are performing a _____

(4) Use a compass (paper if you don't have another kind) to measure $\overline{AB}$. Use your paper compass to show ALL of the points that are the same distance from C as A is from B. Use your paper compass to show ALL of the points that are the same distance from D as A is from B. (Not a quiz! Help your neighbors!)

C

D

(5) Use distance to construct isosceles triangles. $\overline{ON}$ will be the bottom of every triangle (the triangles will overlap) and it will be side that differs in length for every triangle you make. (LEAVE YOUR ARCS SO I CAN SEE WHAT YOU DID) Mark the congruent sides in your diagram with congruence marks.

In △RON, $\overline{RO}$ and $\overline{RN}$ are this long:

In △EON, $\overline{EO}$ and $\overline{EN}$ are this long:

In △FON, $\overline{FO}$ and $\overline{FN}$ are this long:

In △LON, $\overline{LO}$ and $\overline{LN}$ are this long:

In △CON, $\overline{CO}$ and $\overline{CN}$ are this long:

(6) What do you notice about R, E, F, L, and C? _____

(7) What do you think will happen if we continue to make lengths of the two congruent sides shorter? _____

_____

(8) Connect the 5 points (REFLC) with a line segment long enough to intersect with $\overline{ON}$ and label that intersection point T.

(9) How do you think the length of $\overline{OT}$ compares with the length of $\overline{NT}$? _____

Why do you think that and how could you convince me you are correct? _____

_____

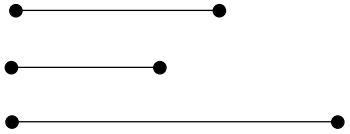
(10) Use your notes to complete this section: $\overline{RT}$ _____ $\overline{ON}$ cutting it in half which means that $\overline{OT}$ is _____ to $\overline{TN}$ and T is the _____ of $\overline{ON}$.

(11) Pat yourself on the back, high five your neighbor, and remind yourself that you are a math genius. Here is a list of the things you just did:

1. Improved your use of the compass – #5
2. Constructed 5 isosceles triangles – #5
3. Constructed a perpendicular bisector – #8
4. Constructed a right angle – #8
5. Illustrated reflection symmetry – #9
6. Justified your relationship between OT and NT (wow, that's the start of a proof!) – #9
7. Anticipated the triangle inequality theorem – #7

You probably don't even know what some of those things are yet!

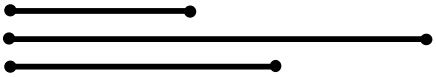
(12) construct a triangle from the segment lengths below



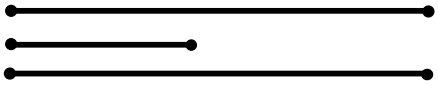
(13) Since you can't leave now anyway because your head is so big with your crazy Geometry skills, here are 3 more triangle construction problems for you. BE SURE TO label each **vertex** (corner) with a letter

a) Construct triangle BIG so that the 3 sides have these lengths:

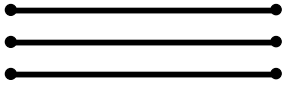
b) Excellent! Now construct triangle DEL so that the 3 sides have these lengths:



c) Construct triangle YUP so that the 3 sides have these lengths:



d) Construct triangle MEH so that the 3 sides have these lengths:



(14) What type of triangle are the triangles in #13? (equilateral, isosceles, scalene) Write the type of triangle next to each triangle.

(15) Are any of the triangles you constructed in problem 13 congruent (same size and shape)? How do you know?

(16) Draw a long line below with a straightedge. Use the lengths below to construct a segment whose length is equal to the sum of the lengths of the segments. 

(17) Use the length below to draw $\overline{ND}$ such that $\overline{ND}$ is 4 times the length of the segment below. Label the midpoint of $\overline{ND}$ point M.How do you know it is the midpoint?

(18) Almost done. Look at the picture at right and circle the statement that most accurately answers the question, "Which step have you reached today?"