Geometry Regents Lomac 2015-2016 **Date** 1/11 **due** 1/14 **Similarity: Dilations as Transformations 5.6R**

Name ____ **Per**______

LO: I can perform transformations and explain the commonalities and differences between rigid transformations and dilations.

☐ **DO NOW** On the back of this packet

☐ (1) **Transformations . . .**

ruler, highlighters

Are functions (rules) that assign each point in the plane to a unique point

$$F(P) = P'$$

Rigid motions map a line to a _______, a ray to a ______, a segment to a ___________, and an angle to an _____

Rigid motions preserve ___________________ of segments (PQ = P'Q').

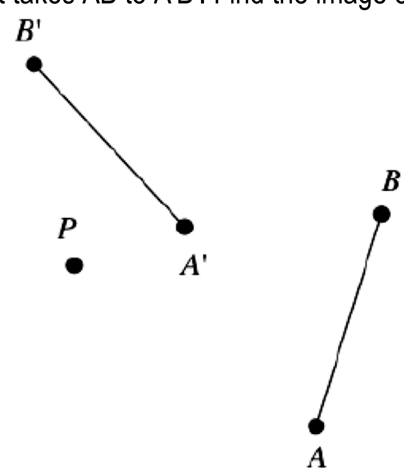
Rigid motions preserve the ___________________ of angles.

Based on our drawings in 5.1 through 5.6, do you think dilations are rigid motions? Why or why not?

☐ (2) **Rigid Transformations Review**

compass

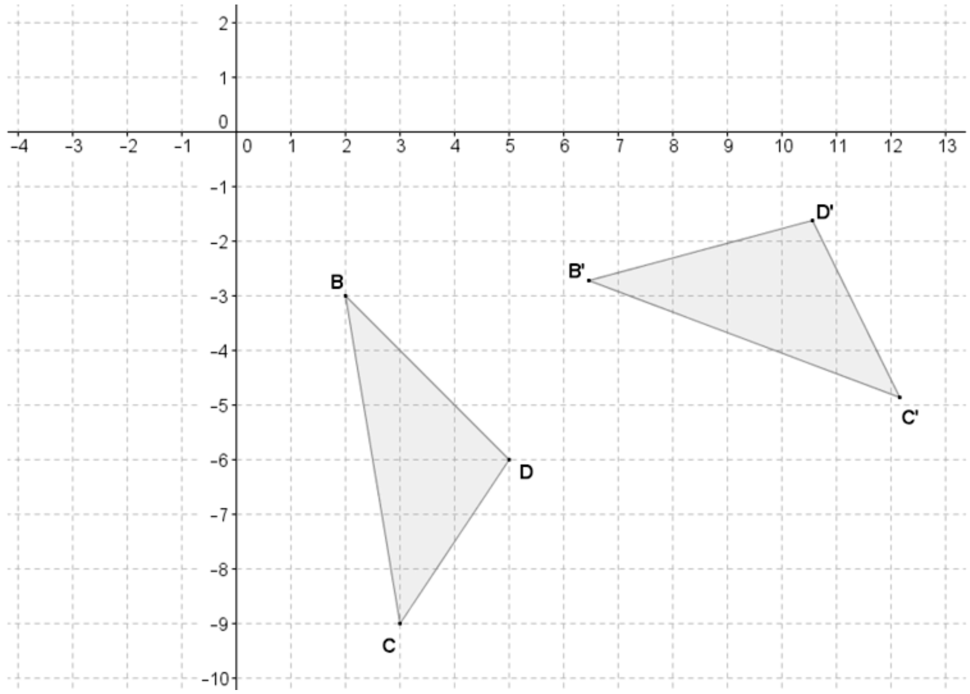
Find the center and the angle of the rotation that takes AB to A'B'. Find the image of P' of point P under this rotation. Complete the function notation.



R___,_____(_____)

☐ (3) **Rigid Transformations Review**
compass

☐ (a) In the diagram below, △B'C'D' is the image of △BCD after a rotation about a point A. What are the coordinates of point A, and what is the angle of the rotation? Complete the function notation.



R___,_____(_____)

☐ (4) **Rigid Transformations Review**
compass

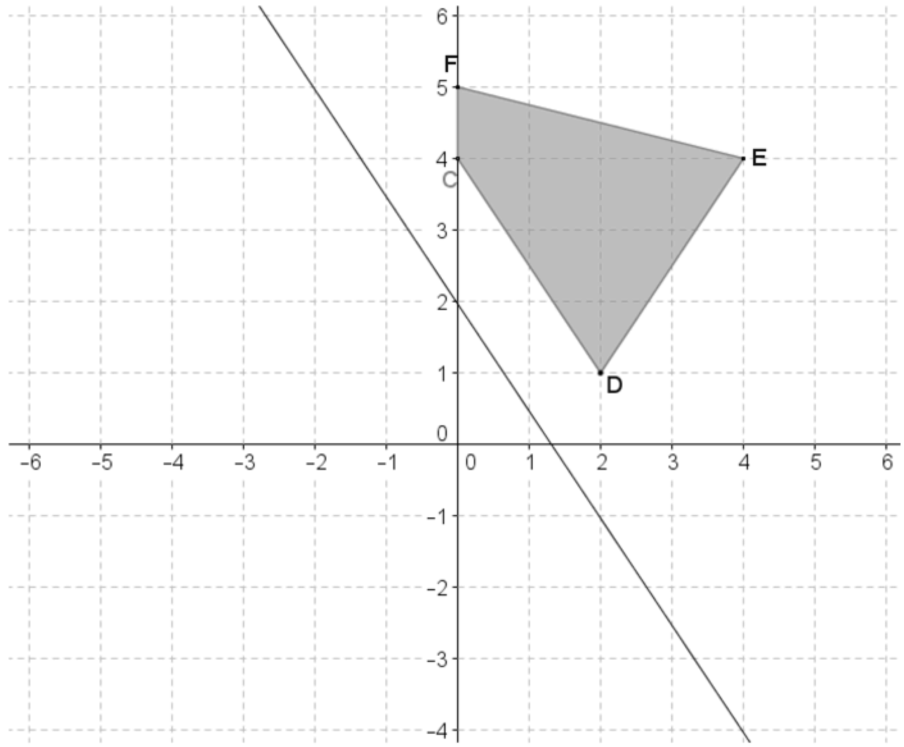
Construct the line of reflection for the reflection that takes point A to point A' and label it *m*. Find the image P' under this reflection. Complete the function notation.

r_____(A) and r_____(P)

☐ (5) compass

Rigid Transformations Review

Michael tells you that the vertices of the image of quadrilateral CDEF reflected over the line representing the equation $y = -\frac{3}{2}x + 2$ are the following: C'(-2,3), D'(0,0), E'(–3, –3), and F'(–3,3). Do you agree or disagree with Michael? Explain.



☐ (6) compass

Rigid Transformations Review

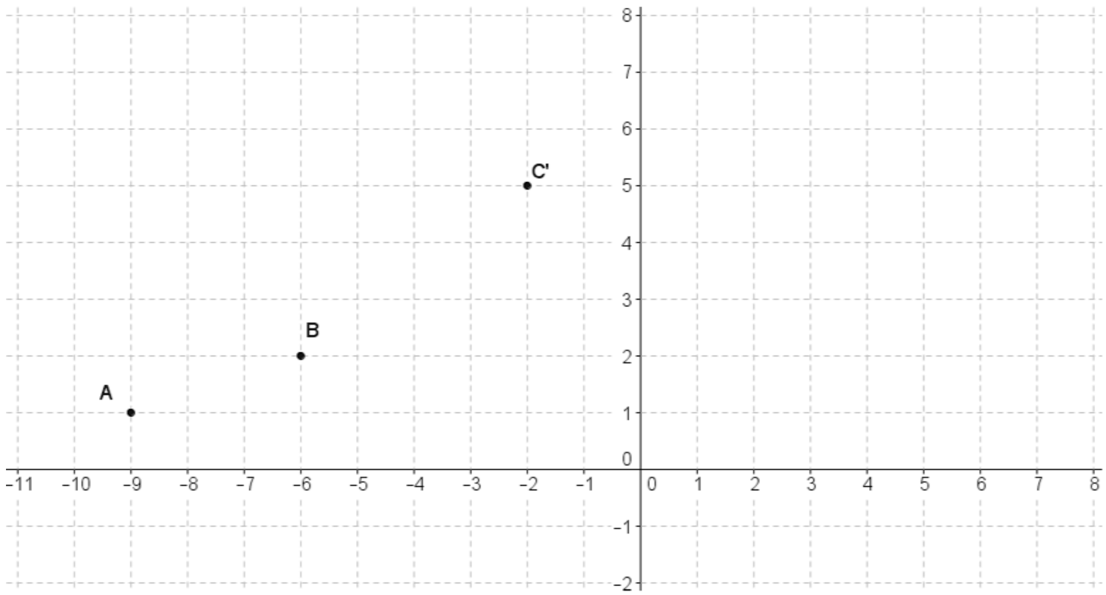
A translation takes A to A'. Find the image P' and pre-image P'' of point P under this translation. Find a vector that describes the translation.

T______(A)

☐ (7) compass

Rigid Transformations Review

The point C' is the image of point C under a translation of the plane along a vector.



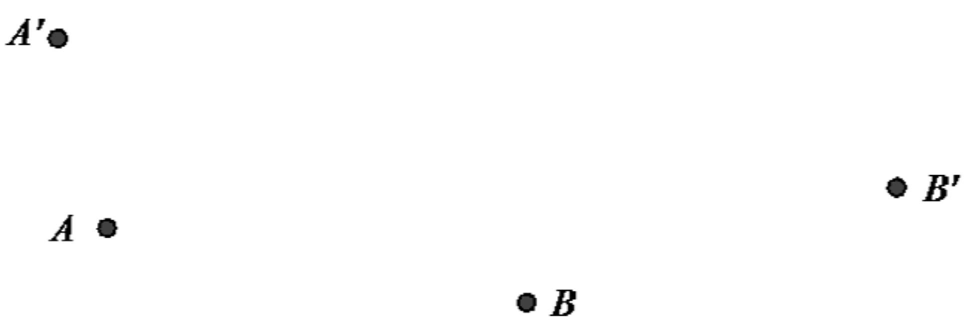
☐ (a) Find the coordinates of C if the vector used for the translation is $\overrightarrow{BA}$.

☐ (b) Find the coordinates of C if the vector used for the translation is $\overrightarrow{AB}$.

☐ (8) compass

Rigid Transformations Review

A dilation with center O and scale factor r takes A to A' and B to B'. Find the center O and determine the scale factor r. Complete the function notation.

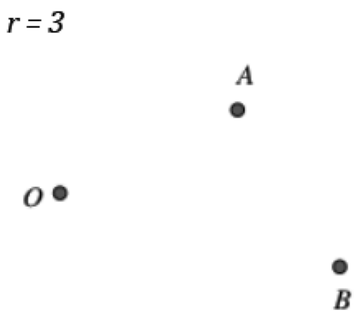


D____,______(A)

☐ (9) compass

Dilations Review

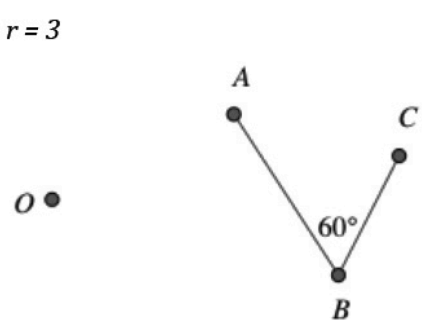
Given a center O, scale factor r, and points A and B, find the points A' = $D_{O,r}(A)$ and B' = $D_{O,r}(B)$. Compare length AB with length A'B' by division; in other words, find $\frac{A'B'}{AB}$. How does this number compare to r?



☐ (10) compass

Dilations Review

Given a center O, scale factor r, and points A, B, and C, find the points A' = $D_{O,r}(A)$, B' = $D_{O,r}(B)$, and C' = $D_{O,r}(C)$. Compare m∠ABC with ∠A'B'C'. What do you find?



☐ (11) **All 4 transformations**

compass

In the diagram below, A' is the image of A under a single transformation of the plane. Use the given diagram to show your solutions to parts (a) – (d).

(a) Describe the translation that maps A → A', and then use the translation to locate P', the image of P.

(b) Describe the reflection that maps A → A', and then use the reflection to locate P'', the image of P.

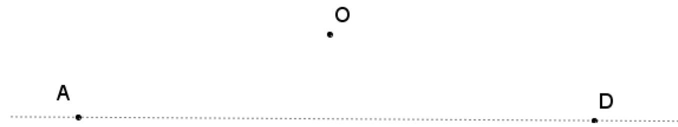
(c) Describe a rotation that maps A → A', and then use the rotation to locate P''', the image of P.

(d) Describe a dilation that maps A → A', and then use the dilation to locate P'''', the image of P.

☐ (12) **Dilation behavior**

compass

On the diagram below, O is a center of dilation and $\overleftrightarrow{AD}$ is a line not through O. Choose two points B and C on $\overleftrightarrow{AD}$ between A and D.



(a) Dilate A, B, C, and D from O using scale factor r = ½. Label the images A', B', C', and D', respectively.

(b) Dilate A, B, C, and D from O using scale factor r = 2. Label the images A'', B'', C'', and D'', respectively.

(c) Dilate A, B, C, and D from O using scale factor r = 3. Label the images A''', B''', C''', and D''', respectively.

(d) Draw a conclusion about the effect of a dilation on a line segment based on the diagram that you drew. Explain.

☐ (13) **Inverse Transformations** All transformations have an inverse that returns points to their original location.

Write the inverse transformation for each of the following so that the composition of the transformation with its inverse will map a point to itself on the plane. (You may want to make a sketch for each to help you see how to "go backwards") For example, the inverse of $D_{B,\ 3}$ is $D_{B,\ 1/3}$

(a) $T_{\overrightarrow{AB}}$

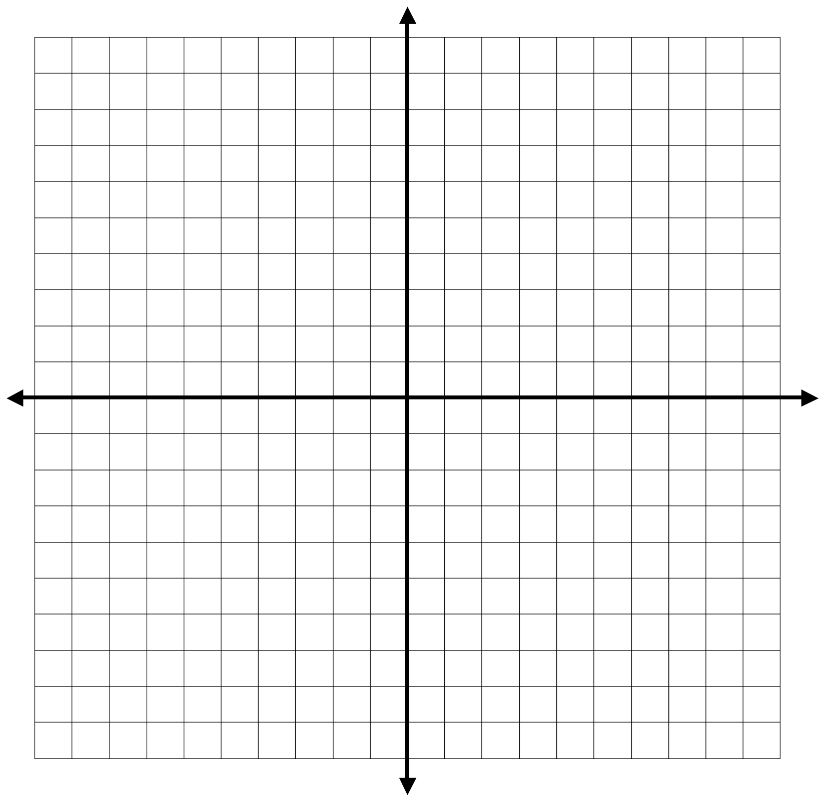
(b) $r_{\overleftrightarrow{AB}}$

(c) $R_{C,45°}$

(d) $D_{O,r}$

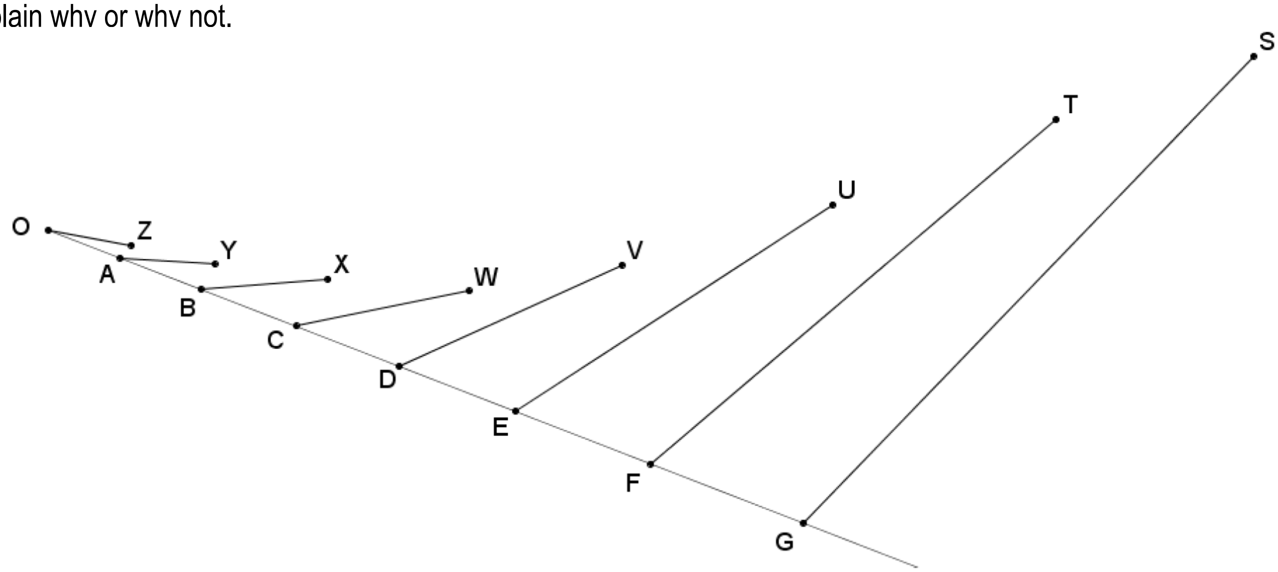
☐ (14) **Dilation behavior**
compass

Given U(1,3), V(–4,–4), and W(–3,6) on the coordinate plane, perform a dilation of △UVW from center O(0,0) with a scale factor of 3/2. ($D_{origin,3/2}$(△UVW)) Determine the coordinates of images of points U', V', and W', and describe a numeric relationship between the coordinates of the image points and the coordinates of the preimage points.



☐ (15) **Dilation behavior**
compass

Points B, C, D, E, F, and G are dilated images of A from center O with scale factors 2, 3, 4, 5, 6, and 7, respectively. Are points Y, X, W, V, U, T, and S, all dilated images of Z under the same respective scale factors? Explain why or why not.



☐ (16) **Exit Ticket**

ruler — On the last page

☐ (17) **Homework:**

☐ (1) For each diagram, find the center and scale factor that takes A to A' and B to B', if a dilation exists. Explain how you know that the dilation does or does not exist.

DIAGRAM #1

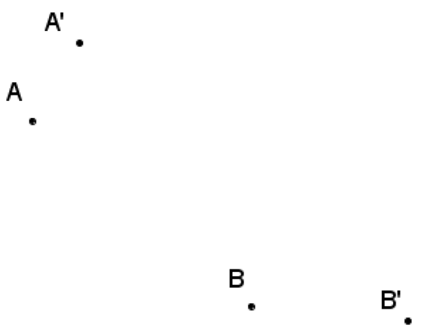
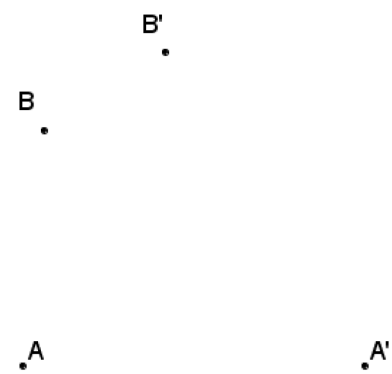
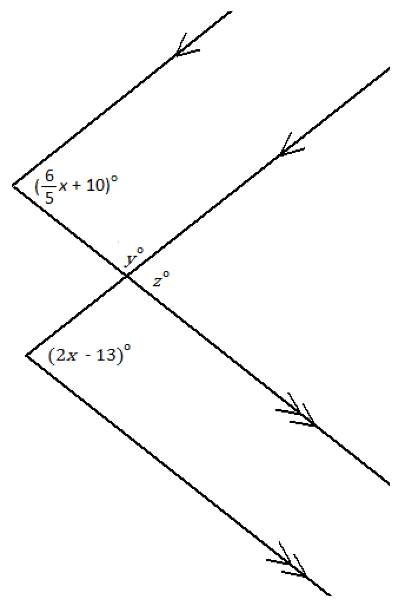


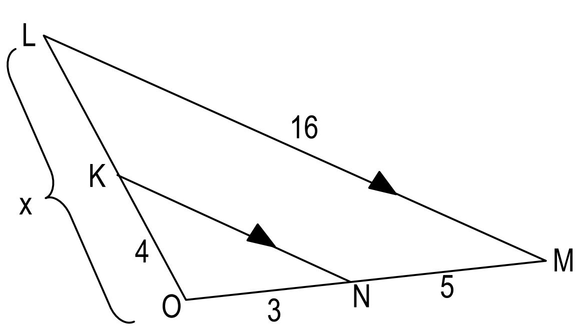
DIAGRAM #2

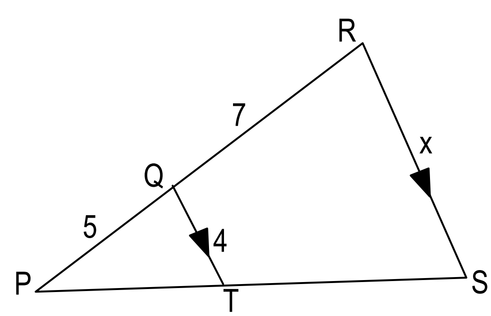


☐ (2) Find the measure of x, y, and z. State any angle relationships you use.



☐ (3) Find the measure of x for each diagram.



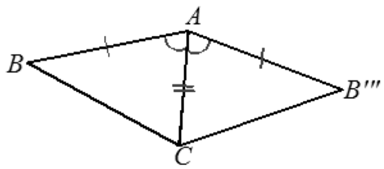


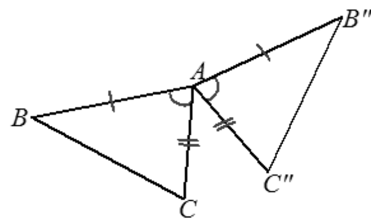
☐ (17) compass, straightedge

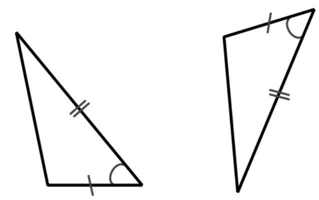
Homework:

☐ (4) If two triangles satisfy the SAS criteria, describe the rigid motion(s) that would map one onto the other in the following cases. First, match each part (a, b, and c) to the diagram it describes.

(a) The two triangles shared a single common vertex?
(b) The two triangles were distinct from each other (share no vertices or sides)?
(c) The two triangles shared a common side?







☐ (5) Construct Square BOXY. BO has been drawn for you. (Hint: it may help to extend the length of BO).

Exit Ticket Name_______________________________ Date ___________ Per______ 5.6R

(1) The LO (Learning Outcomes) are written below your name on the front of this packet. Demonstrate your achievement of these outcomes by doing the following:

Read the lesson summary. Make an example sketch and use it to describe what dilations have in common with rigid transformations and how they are different. You may refer to problems from the lesson.

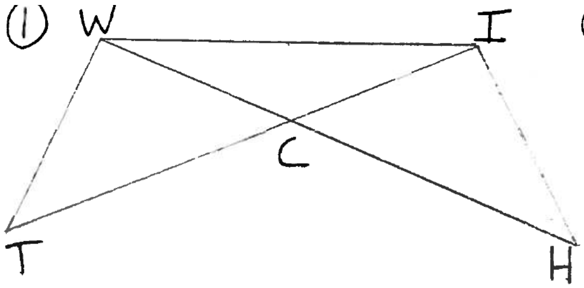
Lesson Summary

- **There are two major classes of transformations; those that are distance-preserving (translations, reflections, rotations) and those that are not (dilations).**
- **Like rigid motions, dilations involve a rule assignment for each point in the plane and also have inverse functions that return each dilated point back to itself.**

DO NOW **Name**________________________________ **Date** ___________ **Per**______ **5.6R**

(1) PROOF PROGRESS **M**: Write a proof for #1 or #2. Attach this to the top of your "Proof Progress" packet.

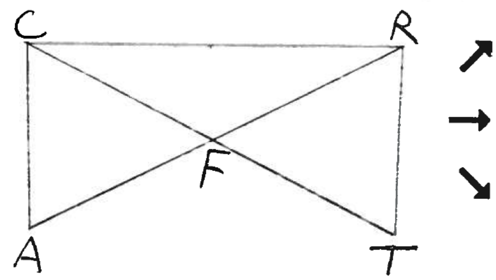
(1)



Given: $\triangle WCT \cong \triangle ICH$

Prove: $\triangle WTI \cong \triangle IHW$

(2)



Given: $\overline{AR} \cong \overline{CT}$

$\overline{CA} \cong \overline{RT}$

Prove: $\triangle$___ $\cong \triangle$___

(2) Complete each statement

(a) Translate along a __________________ (b) Rotate around a ________________

(b) Reflect ___________ __ ________________ (d) Dilate from a ___________ with a ______ ______

(3) What about the joke below is supposed to make you smile?