Geometry – Mrs. Cowen
Unit 2B – Day 1 Notes

Name_______________________________
Date________________

Rigid Motion – A ***transformation*** (movement) of a 2D figure in the plane such that **segment length** and **angle measure** are preserved.

Translation – Moving a 2D figure a given distance in a given direction. This is referred to as translating along a ***Vector***.

Pre-Image: start

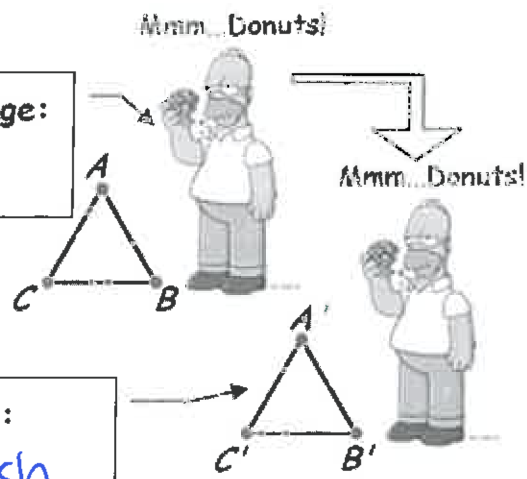
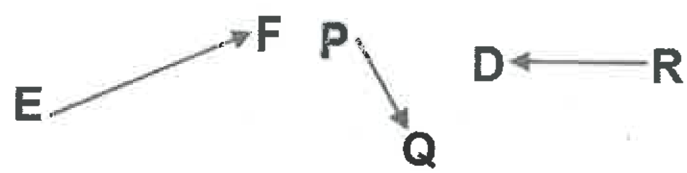
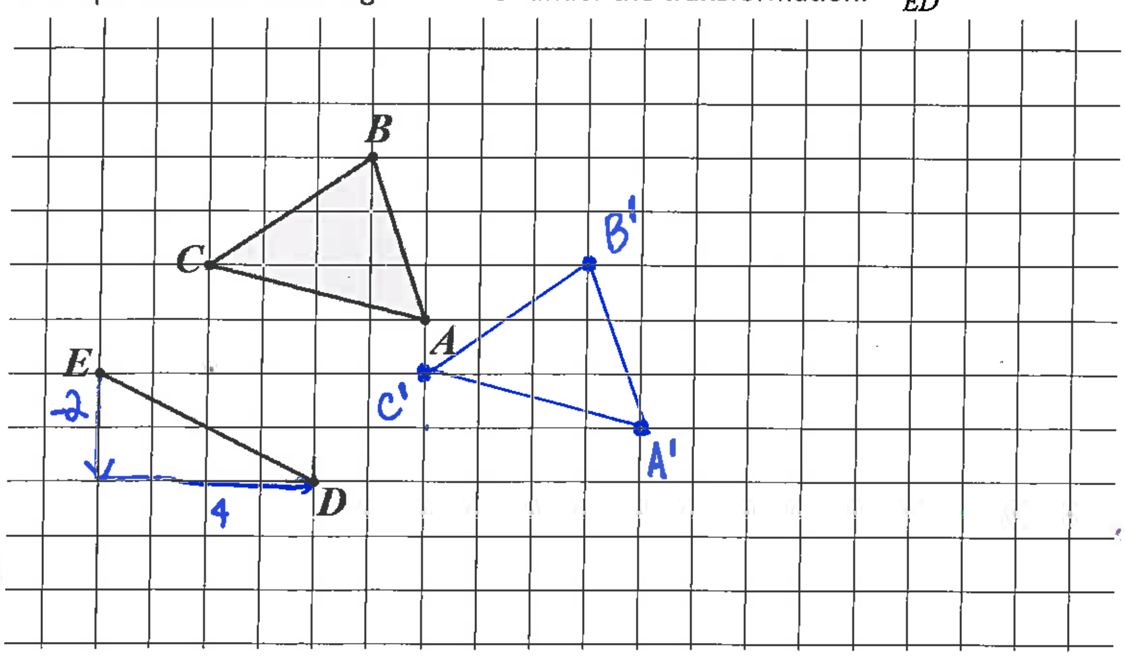


Image: finish

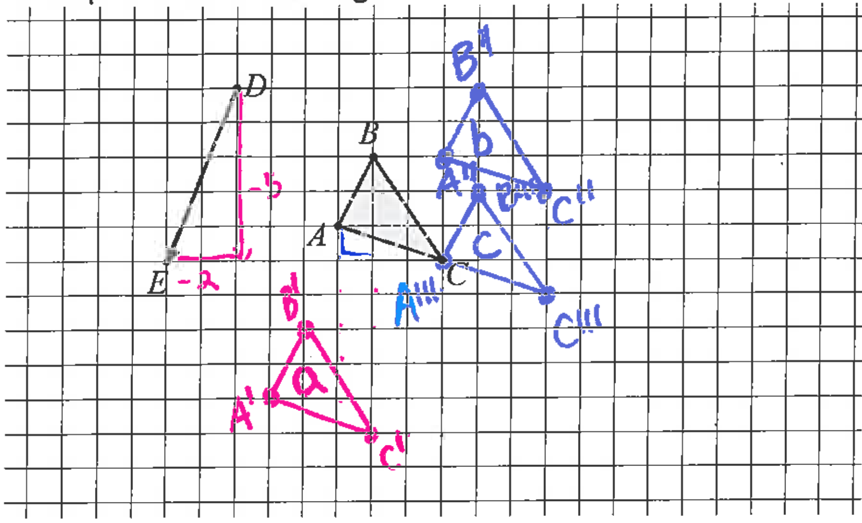
Vector – a distance and direction represented by a ray.



1. Graph and label the image of ΔABC under the transformation: $T_{\overline{ED}}$ ← translation along vector $\overrightarrow{ED}$



2. Graph and label the image of ΔABC under each transformation:



a. Translate ΔABC along vector $\overline{DE}$

b. $T_{<3,2>}$ (x ↓, y ↓) right 3, up 2

c. $T_{\overrightarrow{AC}}$ down 1 over 3

d. To be a *Rigid Motion,* translation must preserve ***segment length*** and ***angle measure***. Give evidence from your graphs to demonstrate how each is preserved.

Segment Length

$\overline{AC} = \sqrt{1^2+3^2} = \sqrt{1+9} = \sqrt{10}$

$A'C' = \sqrt{1^2+3^2} = \sqrt{1+9} = \sqrt{10}$

$A''C'' = \sqrt{1^2+3^2} = \sqrt{1+9} = \sqrt{10}$

$A'''C''' = \sqrt{1^2+3^2} = \sqrt{1+9} = \sqrt{10}$

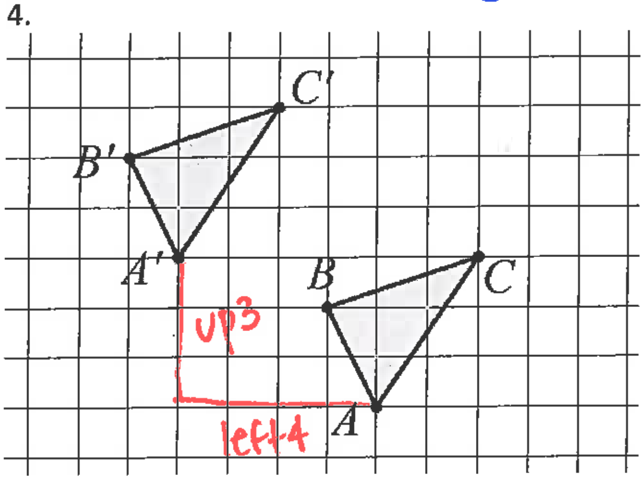
Corresponding lengths are congruent.

Angle Measure

(a protractor or tracing paper may be helpful)

Corresponding ∠s are ≅.

4.

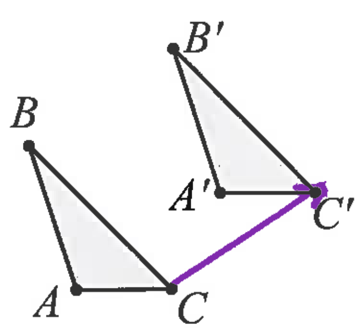


a. Precisely describe the translation that maps ΔABC onto $\Delta A'B'C'$.

* A translation of Δ ABC 4 units left & 3 units up.

* $T_{(-4,3)}$

* $T_{<-4,3>}$



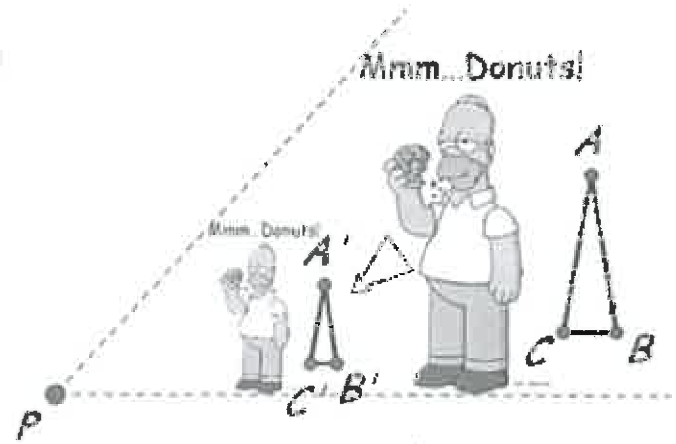
b. Precisely describe the translation that maps ΔABC onto $\Delta A'B'C'$.

Translation along vector $\overrightarrow{CC'}$ of Δ ABC

OR

$T_{\overrightarrow{CC'}}$

Dilation – Enlarging or shrinking a 2D figure proportionally with respect to a given center point.



Dilation Factor = $\dfrac{\text{Image (finish)}}{\text{Pre-image (start)}}$

5. This picture of Homer Simpson and ΔABC represents a Dilation.

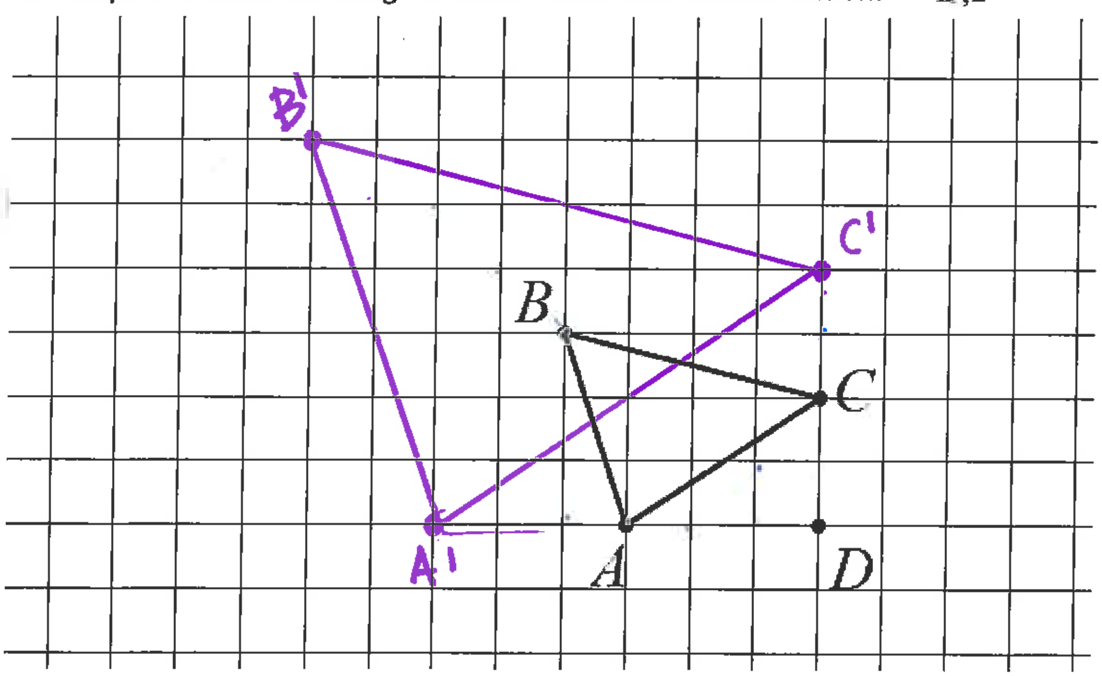
a. Which point is the center of dilation?

•P

b. Is Dilation a Rigid Motion? Explain why or why not.

NO, dilation is not a rigid motion, length is not preserved but ∠ measure is preserved.

6a. Graph and Label the image of ΔABC under the transformation: $D_{D,2}$ ← a dilation around D by a factor of 2.



Dilate by a factor of $\frac{A'B'}{AB}$

6b. To be a *Rigid Motion,* Dilation must preserve ***segment length*** and ***angle measure***. Obviously segment length was not preserved. Give evidence from your graphs to demonstrate:

Segment Length Not Preserved

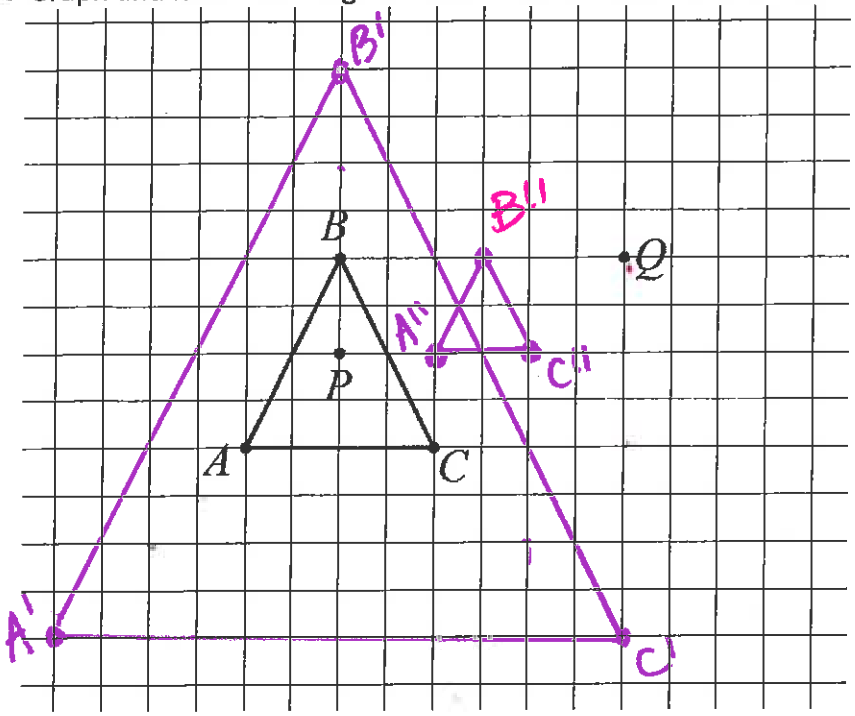
$AC = \sqrt{13}$ $A'C' = \sqrt{52}$

$\overline{AC} \neq \overline{A'C'}$

Angle Measure is Preserved
(a protractor or tracing paper may be helpful)

∠ measure is preserved.

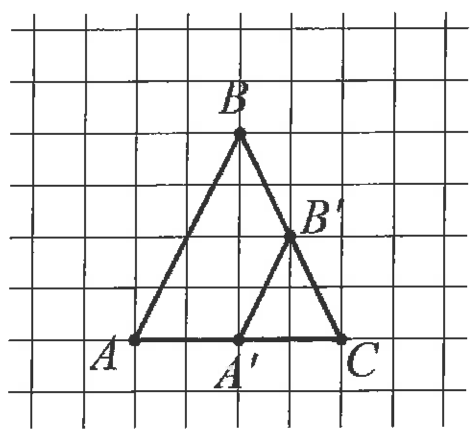
7. Graph and label the image of ΔABC under each transformation:



a. $D_{P,3}$

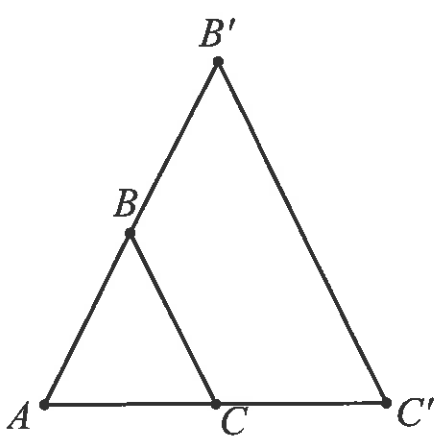
b. About center Q such that $\frac{A''B''}{AB} = \frac{1}{2}$.

8.



a. Describe precisely the transformation that maps ΔABC onto $\Delta A'B'C'$.

Dilate Δ ABC about point C by a factor of ½.



b. Describe precisely the transformation that maps ΔABC onto $\Delta AB'C'$.

A Dilation of Δ ABC ~~by~~ about point A by a factor $\frac{AC'}{AC}$