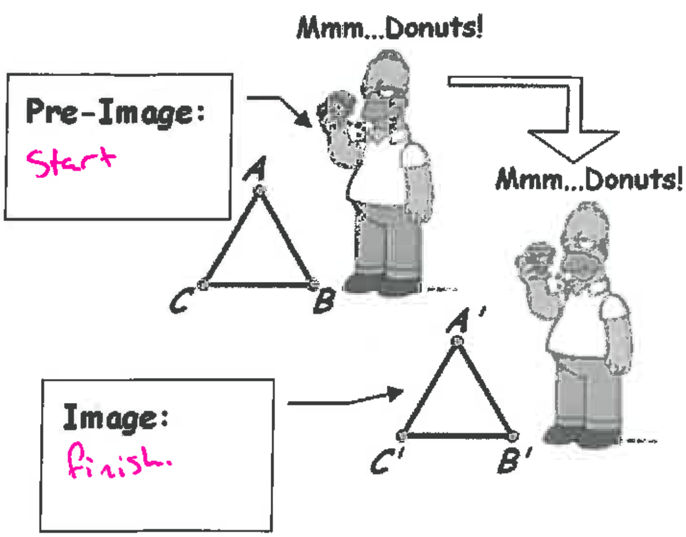
Geometry – Mr. Bo
Unit 2B – Day 1 Notes

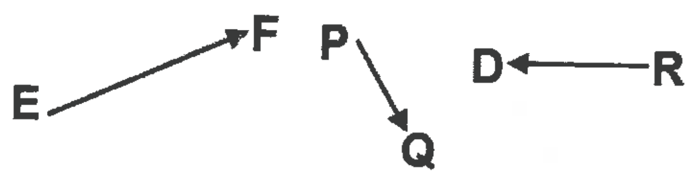
Name *Notes.*
Date

**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***.

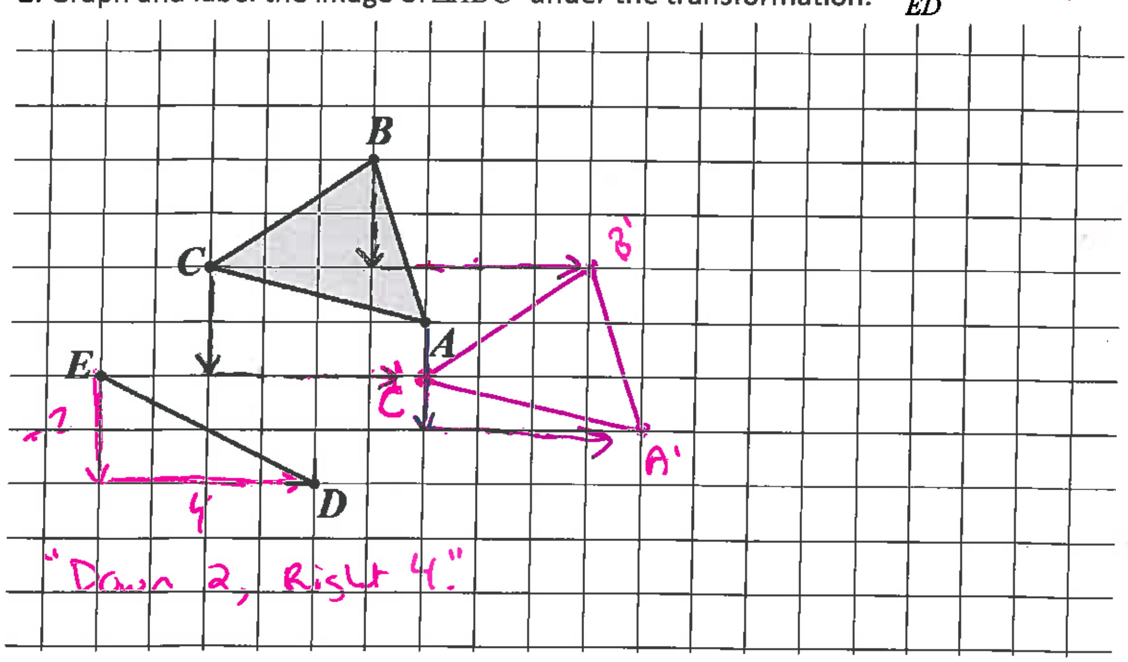



**Vector** – a distance and direction represented by a ray.

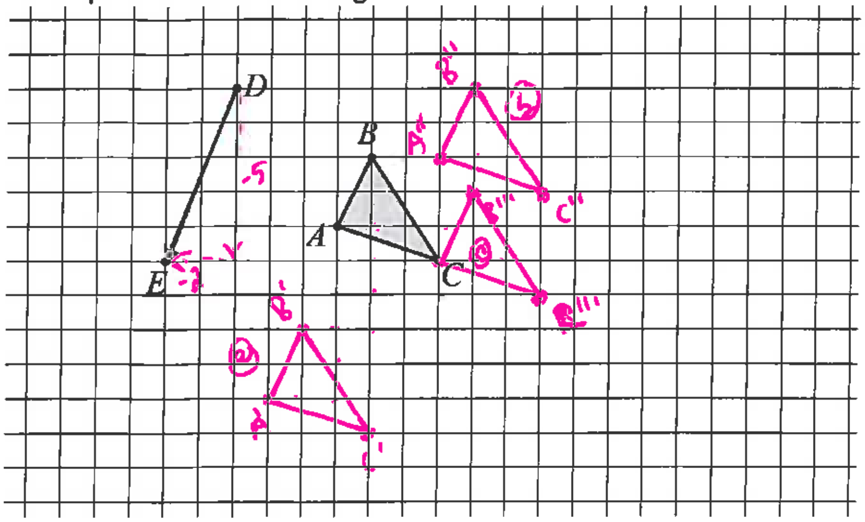



*each vector is identified by its direction + length.*

1. Graph and label the image of $\Delta ABC$ under the transformation: $T_{\overrightarrow{ED}}$ *translate along vector $\overrightarrow{ED}$*



2. Graph and label the image of $\Delta ABC$ under each transformation:




a. Translate $\Delta ABC$ along vector $\overrightarrow{DE}$ Down 5, Left 2

b. $T_{<3,2>}$ Right 3, up 2

c. $T_{\overrightarrow{AC}}$ Right 3, Down 1

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

**Segment Length**

$AB = \sqrt{1^2+2^2} = \sqrt{5}$

$A'B' = \sqrt{1^2+2^2} = \sqrt{5}$

$\overline{AB} \cong \overline{A'B'}$

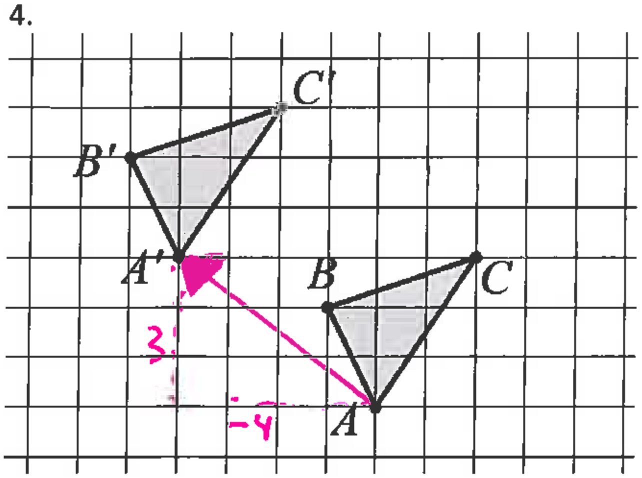
**Angle Measure**

*(a protractor or tracing paper may be helpful)*

$\angle A \cong \angle A'$

(measured with tracing paper)

4.

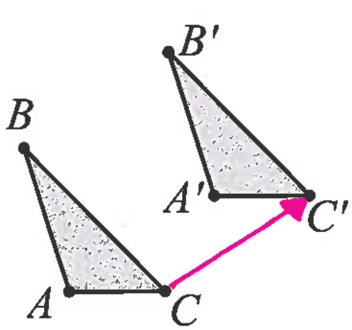



a. Precisely describe the translation that maps $\Delta ABC$ onto $\Delta A'B'C'$.

Translate $\Delta ABC$ along vector $<-4, 3>$

or

$T_{<-4,3>}$



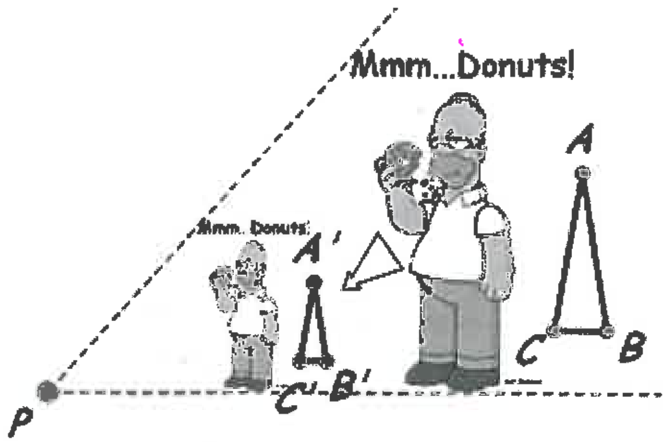

b. Precisely describe the translation that maps $\Delta ABC$ onto $\Delta A'B'C'$.

Translate $\Delta ABC$ along vector $\overrightarrow{CC'}$

or

$T_{\overrightarrow{CC'}}$

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




5. This picture of Homer Simpson and $\Delta ABC$ represents a Dilation.

a. Which point is the center of dilation?

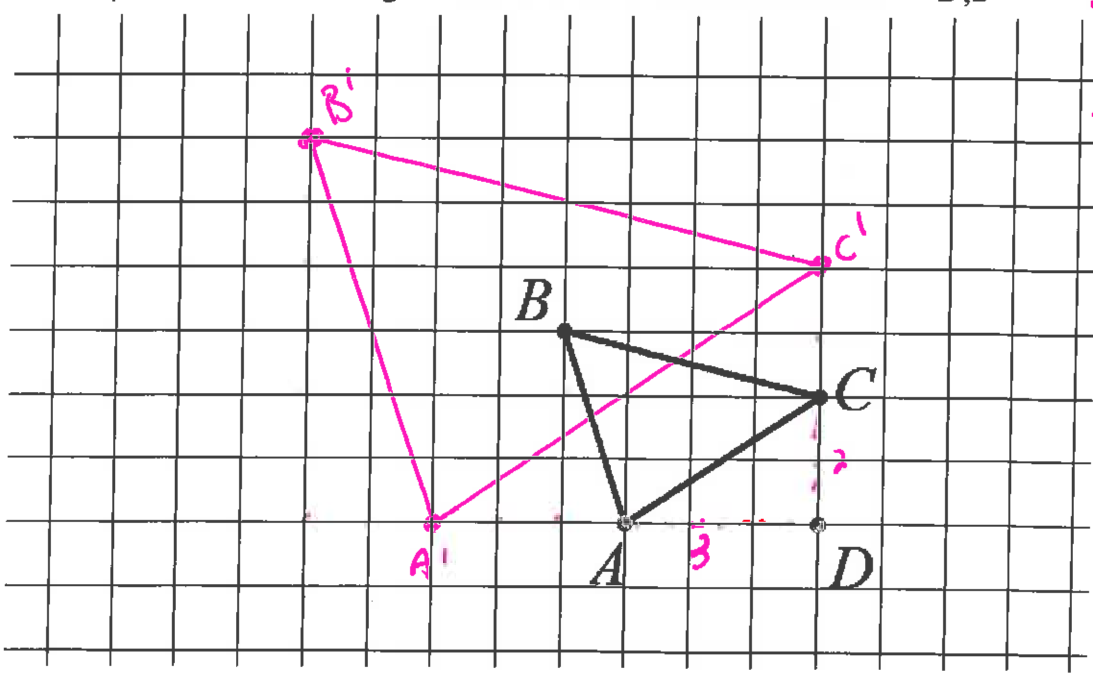
point P is the center.

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

It is not a rigid motion because segment length is not preserved.

6a. Graph and Label the image of $\Delta ABC$ under the transformation: $D_{D,2}$ ← Dilate around D by a factor of 2.

Double the distance from D to each point.




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**

$BA = \sqrt{1^2+3^2} = \sqrt{10}$

$B'A' = \sqrt{2^2+6^2} = \sqrt{40}$

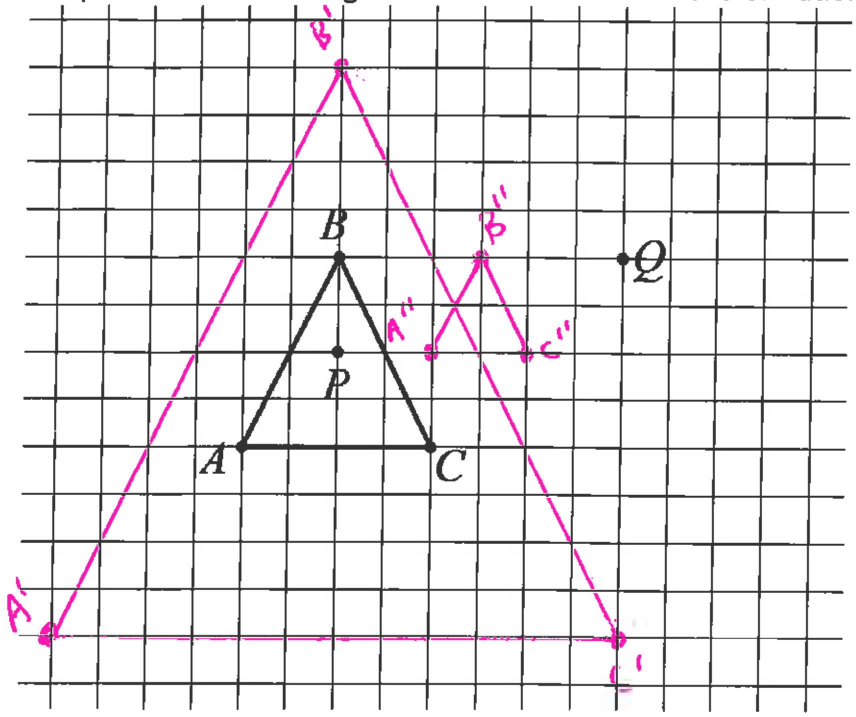
$\overline{BA} \not\cong \overline{B'A'}$

**Angle Measure is Preserved**

*(a protractor or tracing paper may be helpful)*

using tracing paper we can see $\angle A \cong \angle A'$.

7. Graph and label the image of $\Delta ABC$ under each transformation:

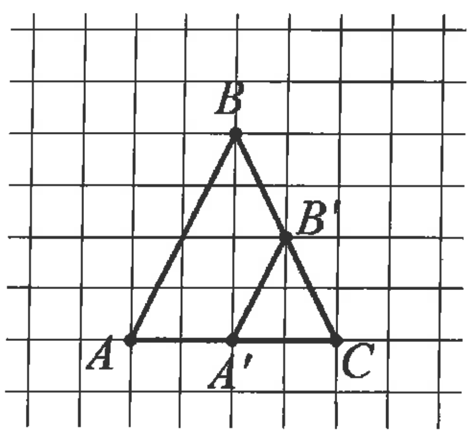



a. $D_{P,3}$

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

- want A"B" to be half as long as AB.
- Dilate by factor of ½.

8.



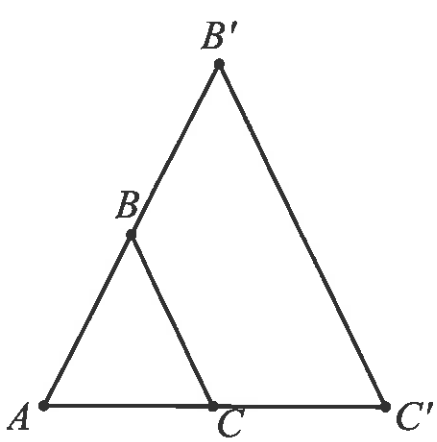

a. Describe precisely the transformation that maps $\Delta ABC$ onto $\Delta A'B'C$.

A'C is half of AC. So...

Dilate $\Delta ABC$ by a factor of $\frac{1}{2}$ about C.

or

$D_{C,\frac{1}{2}}$

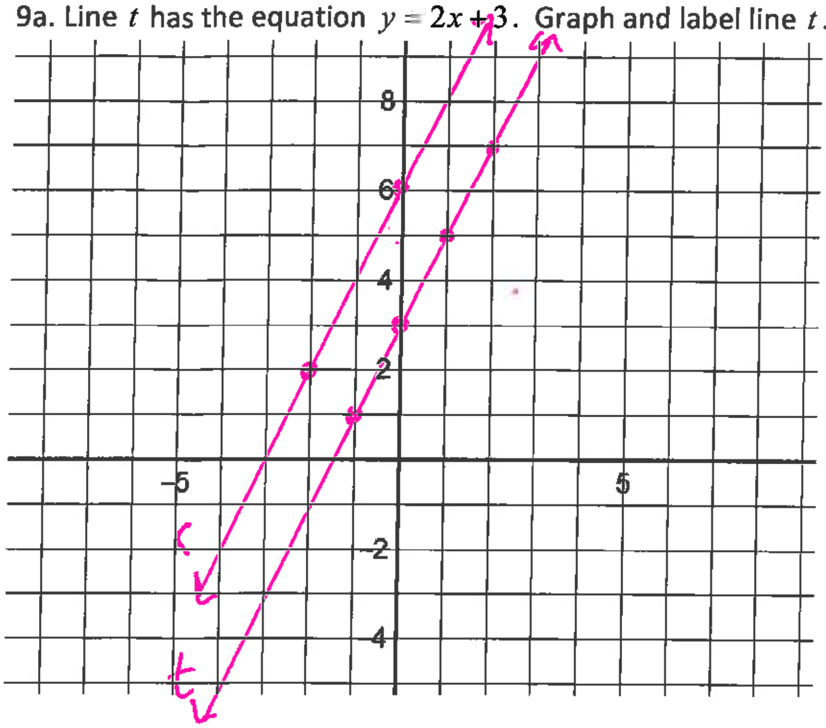



b. Describe precisely the transformation that maps $\Delta ABC$ onto $\Delta AB'C'$.

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

about center A.

9a. Line $t$ has the equation $y = 2x + 3$. Graph and label line $t$.




b. Line $r$ is the image of line $t$ under the transformation $D_2$, using the origin as the center of dilation. Graph and label line $r$ and write the equation that represents this line.

Slope = $\frac{2}{1}$

y-int = 6

$y = 2x + 6$ is the equation of line r.

c. Compare the equations of the lines $t$ and $r$. How do their slopes compare? How do their intercepts compare?

their Slopes are =.

the y-int of r is twice that of t.

d. The line $y = \frac{3}{2}x - 8$ is dialatd by a factor of 4 with respect to the origin. Write the equation of the resulting line.

under $D_4$ slopes remain the same, but the y-int will by mult. by 4:

$$y = \frac{3}{2}x - 32$$