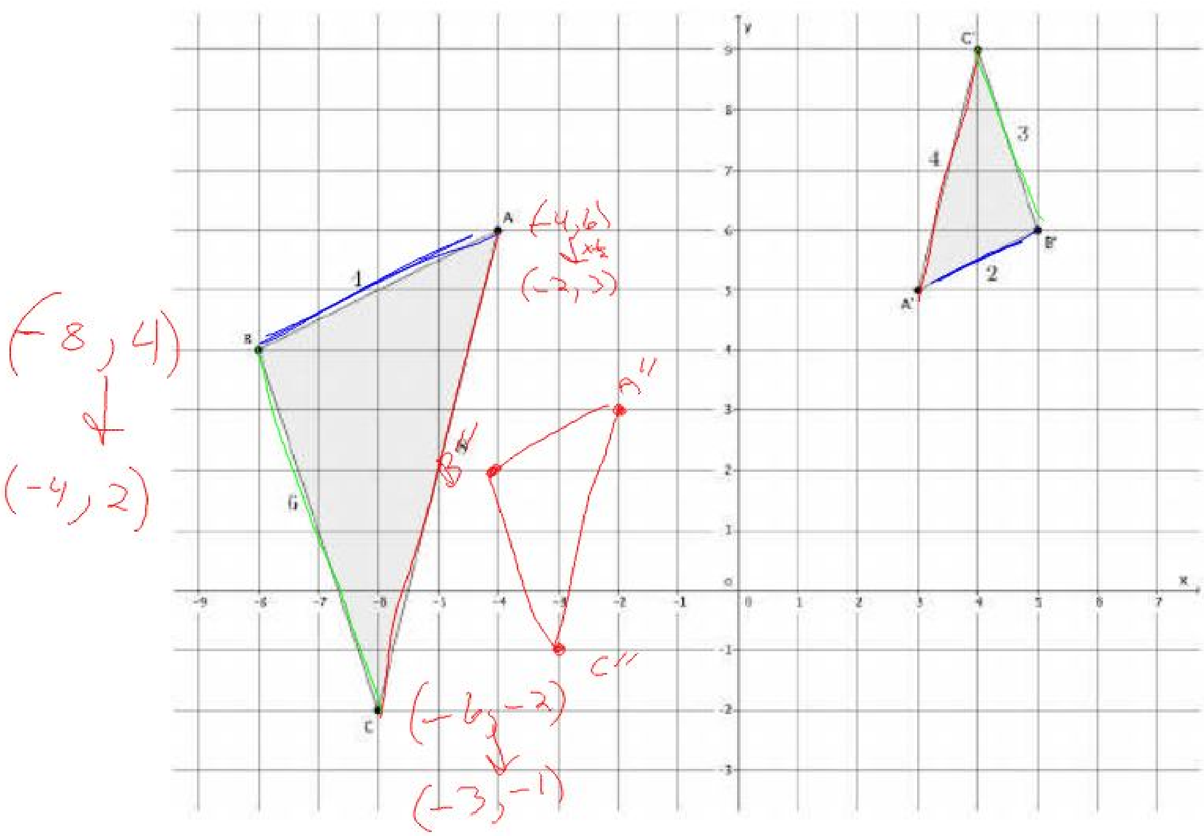
# Lesson 9: Basic Properties of Similarity

## Classwork

### Exploratory Challenge 1

The goal is to show that if $\triangle ABC$ is similar to $\triangle A'B'C'$, then $\triangle A'B'C'$ is similar to $\triangle ABC$. Symbolically, if $\triangle ABC \sim \triangle A'B'C'$, then $\triangle A'B'C' \sim \triangle ABC$.

$r = \frac{N}{O}$




AB $\frac{2}{4} = \frac{1}{2}$

AC $\frac{4}{8} = \frac{1}{2}$

BC $\frac{3}{6} = \frac{1}{2}$

The Δ's are similar.

a. First determine whether or not $\triangle ABC$ is in fact similar to $\triangle A'B'C'$. (If it isn't, then no further work needs to be done.) Use a protractor to verify that the corresponding angles are congruent and that the ratios of the corresponding sides are equal to some scale factor.

b. Describe the sequence of dilation followed by a congruence that proves $\boxed{\triangle ABC \sim \triangle A'B'C'}$.

1) Dilate $\triangle ABC$ with a scale factor $r = \frac{1}{2}$
2) Translate $\triangle A''B''C''$ 5 units right, 2 units up.
3) Rotate the translated $\triangle$ around point $A'$ until $B''C'' = BC$

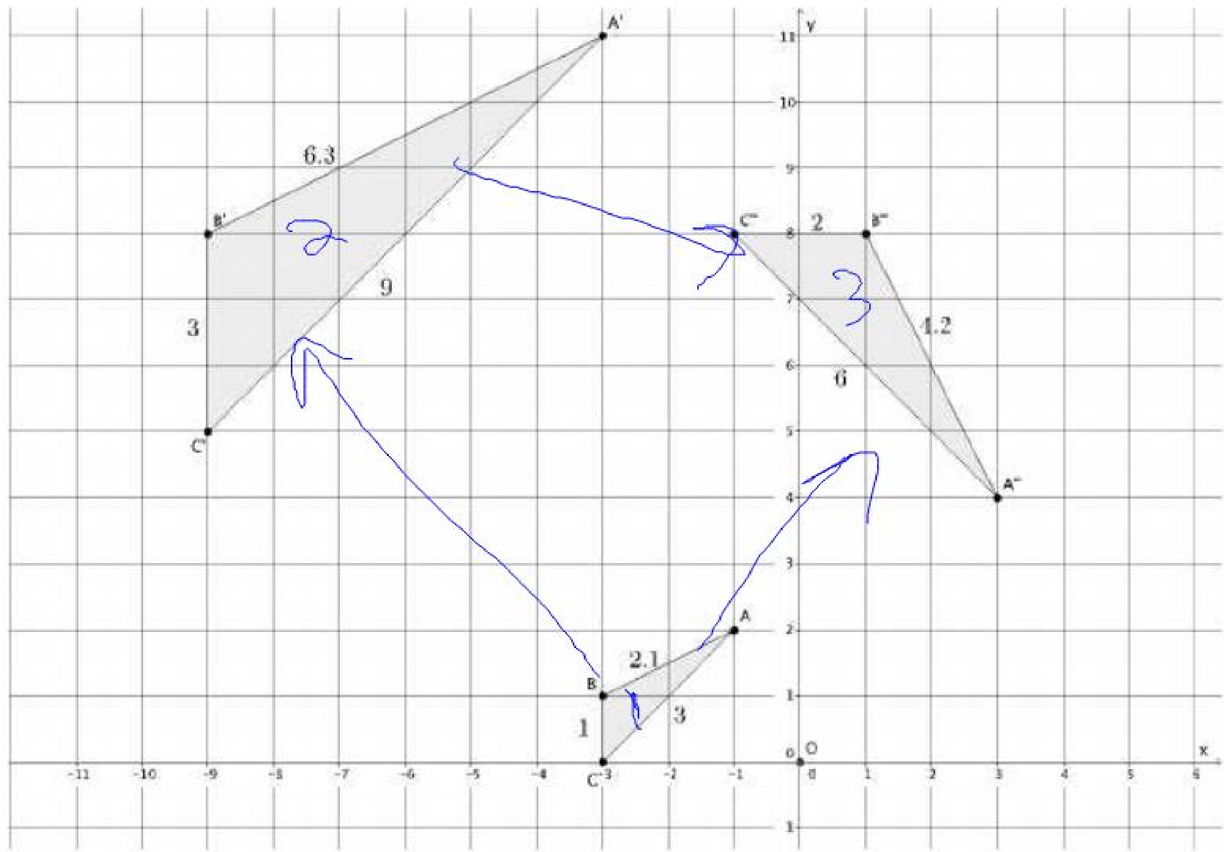
c. Describe the sequence of dilation followed by a congruence that proves $\boxed{\triangle A'B'C' \sim \triangle ABC}$.

1) Dilate $r = 2$

d. Is it true that $\triangle ABC \sim \triangle A'B'C'$ and $\triangle A'B'C' \sim \triangle ABC$? Why do you think this is so?

**Exploratory Challenge 2**

The goal is to show that if $\triangle ABC$ is similar to $\triangle A'B'C'$, and $\triangle A'B'C'$ is similar to $\triangle A''B''C''$, then $\triangle ABC$ is similar to $\triangle A''B''C''$. Symbolically, if $\triangle ABC \sim \triangle A'B'C'$ and $\triangle A'B'C' \sim \triangle A''B''C''$, then $\triangle ABC \sim \triangle A''B''C''$




a. Describe the similarity that proves $\triangle ABC \sim \triangle A'B'C'$.