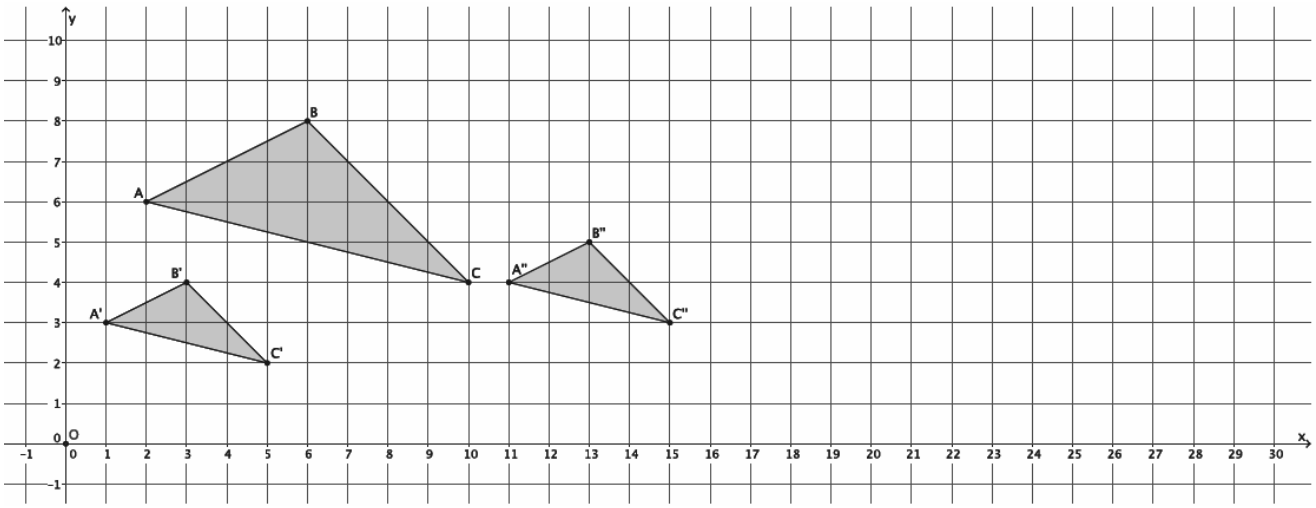
Lesson 8: Similarity

Classwork

Example 1

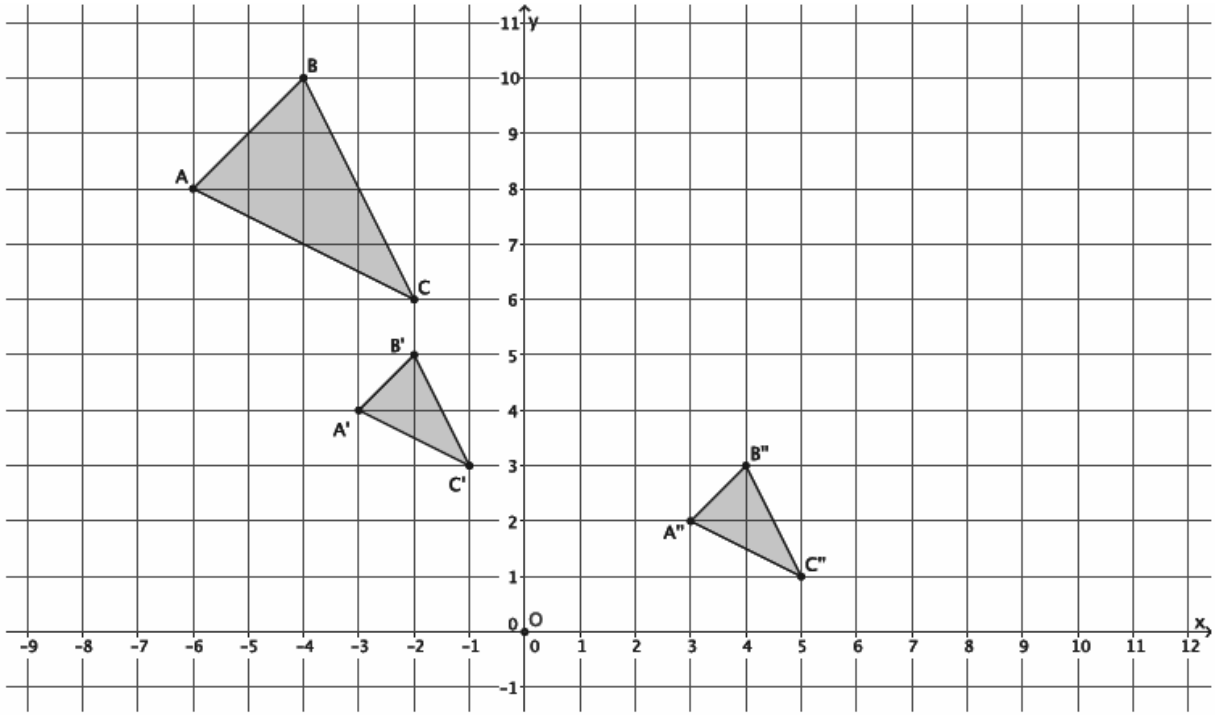
In the picture below, we have a triangle ABC that has been dilated from center O by a scale factor of $r = \frac{1}{2}$. It is noted by $A'B'C'$. We also have triangle $A''B''C''$, which is congruent to triangle $A'B'C'$ (i.e., $\triangle A'B'C' \cong \triangle A''B''C''$).



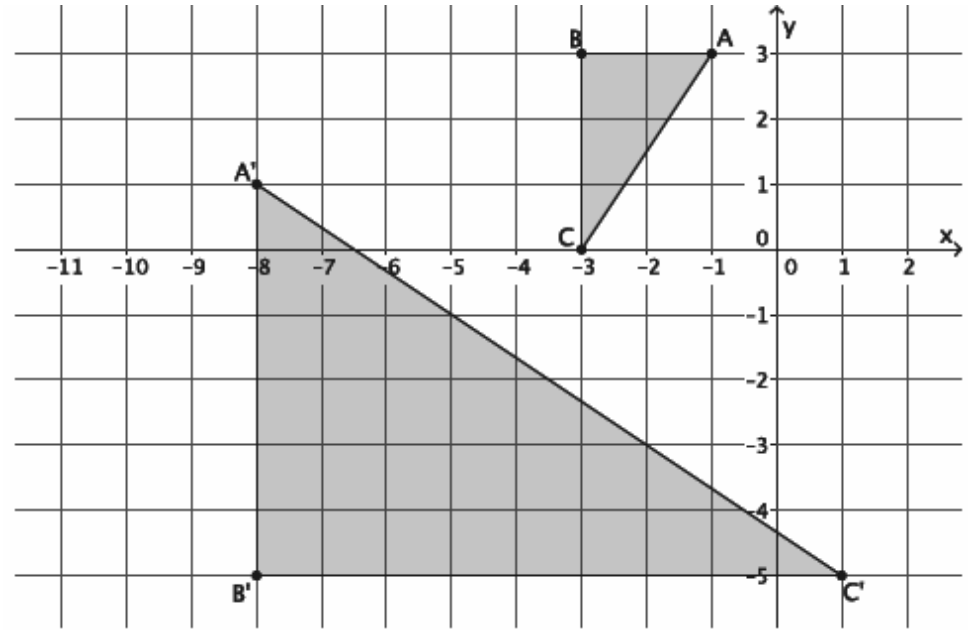
Describe the sequence that would map triangle $A''B''C''$ onto triangle ABC.

Exercises

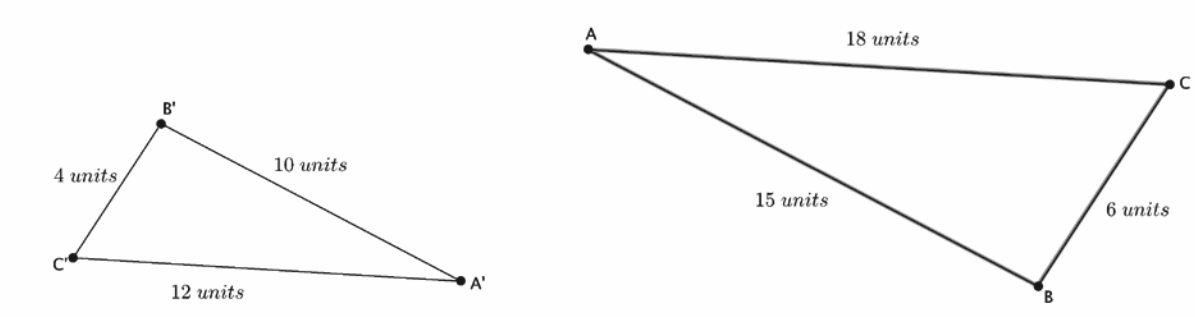
1. Triangle ABC was dilated from center O by scale factor $r = \frac{1}{2}$. The dilated triangle is noted by $A'B'C'$. Another triangle $A''B''C''$ is congruent to triangle $A'B'C'$ (i.e., $\triangle A''B''C'' \cong \triangle A'B'C'$). Describe a dilation followed by the basic rigid motion that would map triangle $A''B''C''$ onto triangle ABC.



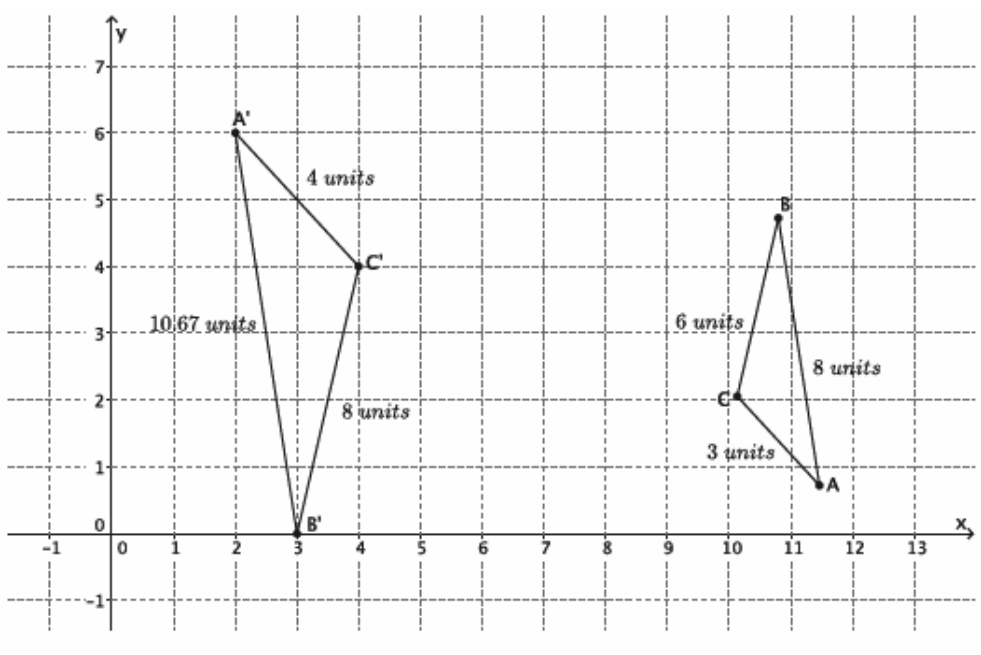
2. Describe a sequence that would show $\triangle ABC \sim \triangle A'B'C'$.



3. Are the two triangles shown below similar? If so, describe a sequence that would prove $\triangle ABC \sim \triangle A'B'C'$ If not, state how you know they are not similar.



4. Are the two triangles shown below similar? If so, describe a sequence that would prove $\triangle ABC \sim \triangle A'B'C'$. If not, state how you know they are not similar.



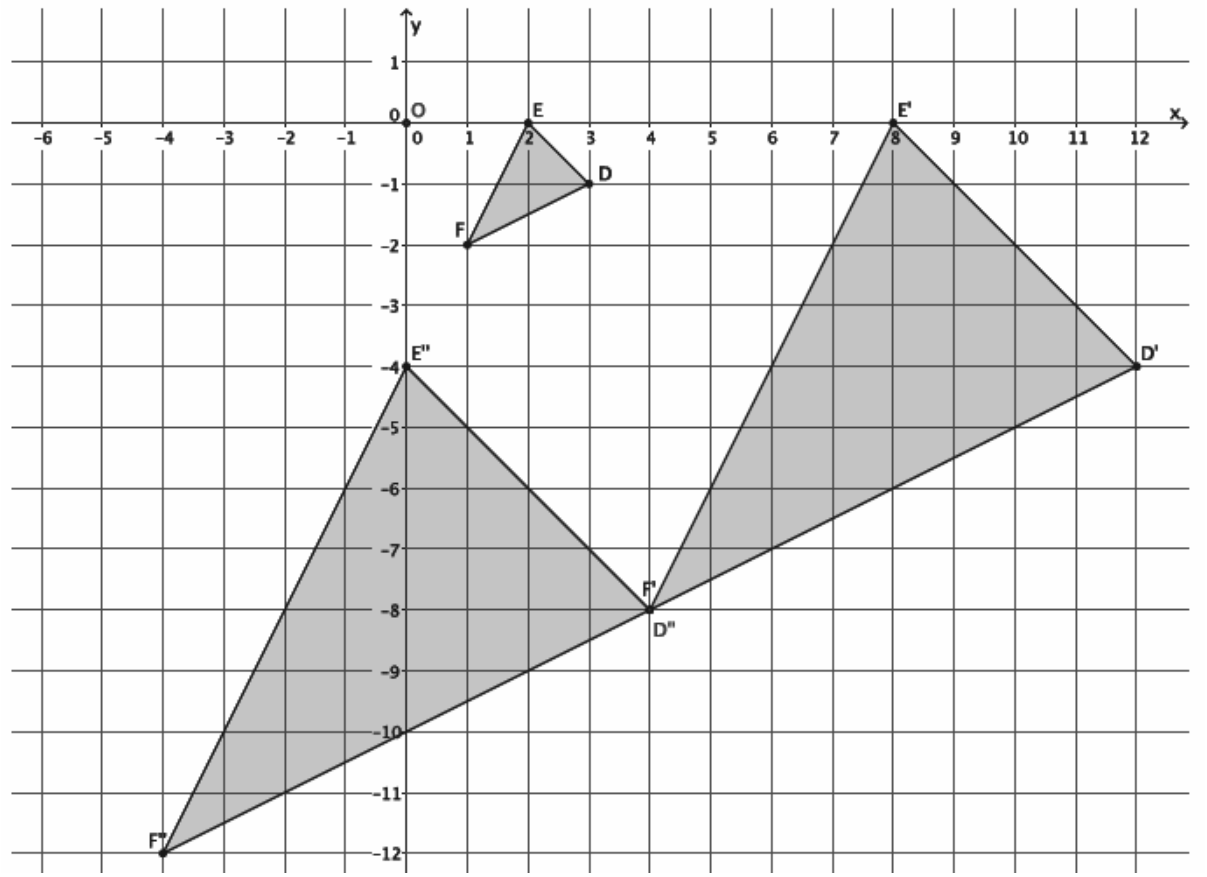
Lesson Summary

A *similarity transformation* (or a *similarity*) is a sequence of a finite number of dilations or basic rigid motions. Two figures are *similar* if there is a similarity transformation taking one figure onto the other figure. Every similarity can be represented as a dilation followed by a congruence.

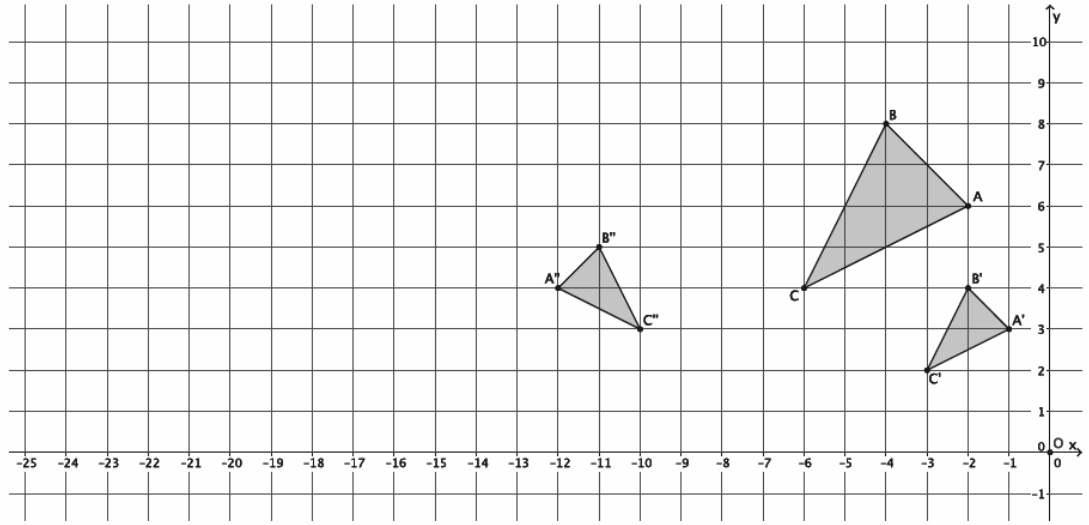
The notation $\triangle ABC \sim \triangle A'B'C'$ means that $\triangle ABC$ is similar to $\triangle A'B'C'$.

Problem Set

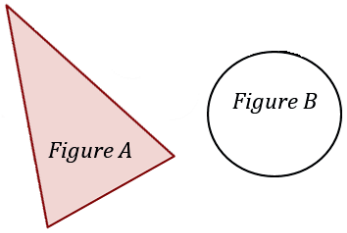
1. In the picture below, we have triangle DEF that has been dilated from center O by scale factor $r = 4$. It is noted by $D'E'F'$. We also have triangle $D''E''F''$, which is congruent to triangle $D'E'F'$ (i.e., $\triangle D'E'F' \cong \triangle D''E''F''$). Describe the sequence of a dilation, followed by a congruence (of one or more rigid motions), that would map triangle $D''E''F''$ onto triangle DEF.



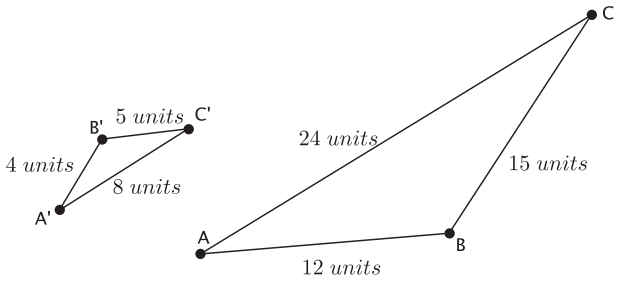
2. Triangle ABC was dilated from center O by scale factor $r = \frac{1}{2}$. The dilated triangle is noted by $A'B'C'$. Another triangle $A''B''C''$ is congruent to triangle $A'B'C'$ (i.e., $\triangle A''B''C'' \cong \triangle A'B'C'$). Describe the dilation followed by the basic rigid motions that would map triangle $A''B''C''$ onto triangle ABC.



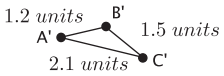
3. Are the two figures shown below similar? If so, describe a sequence that would prove the similarity. If not, state how you know they are not similar.

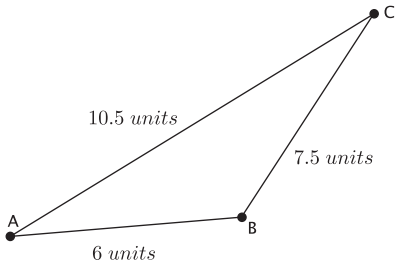


4. Triangle ABC is similar to triangle $A'B'C'$ (i.e., $\triangle ABC \sim \triangle A'B'C'$). Prove the similarity by describing a sequence that would map triangle $A'B'C'$ onto triangle ABC.



5. Are the two figures shown below similar? If so, describe a sequence that would prove $\triangle ABC \sim \triangle A'B'C'$. If not, state how you know they are not similar.





6. Describe a sequence that would show $\triangle ABC \sim \triangle A'B'C'$.