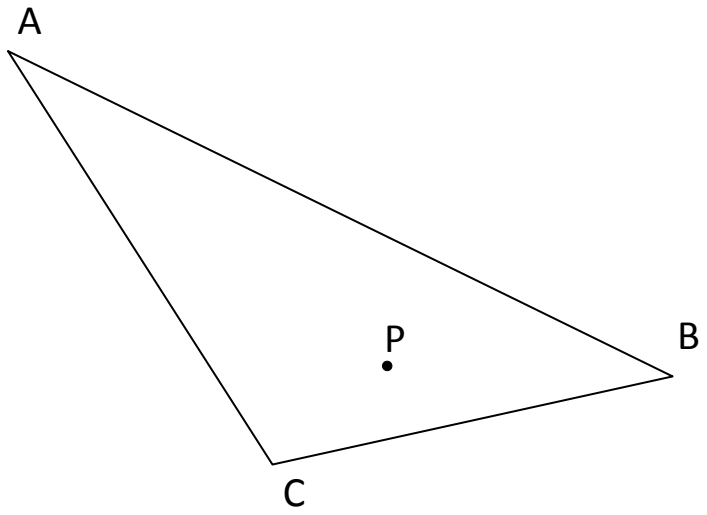
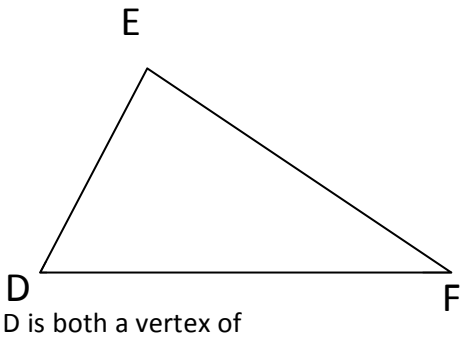
Lesson #1: Dilations with a Compass and Straightedge



1. Follow the steps below to dilate Δ ABC.
   a. Lightly shade Δ ABC.
   b. Draw a ray from P through A.
   c. Use your compass to mark on the ray A' twice as far as A from P.
   d. Repeat this process for a ray from P to B and another ray from P to C to obtain B' and C'.
   e. Connect A' to B' and C' to form a new triangle. In a different way, shade Δ $A'B'C'$.

Δ $A'B'C'$ is a dilation of Δ ABC from point P with a scale factor of 2.

In the following example, the center of dilation is one of the vertices of the triangle.



Point D is both a vertex of the triangle and the center of the dilation.

2. Follow the steps below to dilate $\Delta\, DEF$.
   a. Lightly shade $\Delta\, DEF$.
   b. Draw a ray from D through E.
   c. Use your compass to mark off E' three times as far as E from D.
   d. Repeat this process for a ray from D to F to obtain F'.
   e. Connect E' and F' to form a new triangle. In a different way, shade $\Delta\, DE'F'$.

$\Delta\, DE'F'$ is a dilation of $\Delta\, DEF$ from point P with a scale factor of 3.

3. Look back (or think back) to your two dilations in the coordinate plane from the activity *Coordinate Dilations* and compare them to these two dilations. How does the location of the center point of the dilation affect the location of the image?

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4. Now you will investigate another special property of dilations. Look at each segment of your first two triangles, $\Delta\, ABC$ and $\Delta\, A'B'C'$, and find the length of each segment in cm to the nearest tenth. Label the length on each segment and list the lengths below also.

measure of $\overline{AB}$ = measure of $\overline{A'B'}$ =

measure of $\overline{BC}$ = measure of $\overline{B'C'}$ =

measure of $\overline{AC}$ = measure of $\overline{A'C'}$ =

5. Repeat this for your second pair of triangles on page 2.

measure of $\overline{DE}$ = measure of $\overline{DE'}$ =

measure of $\overline{EF}$ = measure of $\overline{E'F'}$ =

measure of $\overline{DF}$ = measure of $\overline{DF'}$ =

6. What important property of dilations can you identify from your examples?

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7. Rewrite the formal definition of dilation.

Dilation: _____

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8. Recall and rewrite the other important property about image lines of a dilation.

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