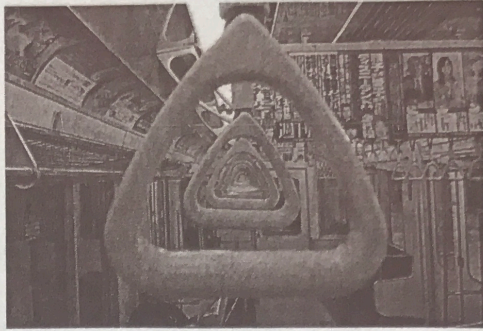


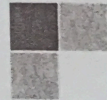
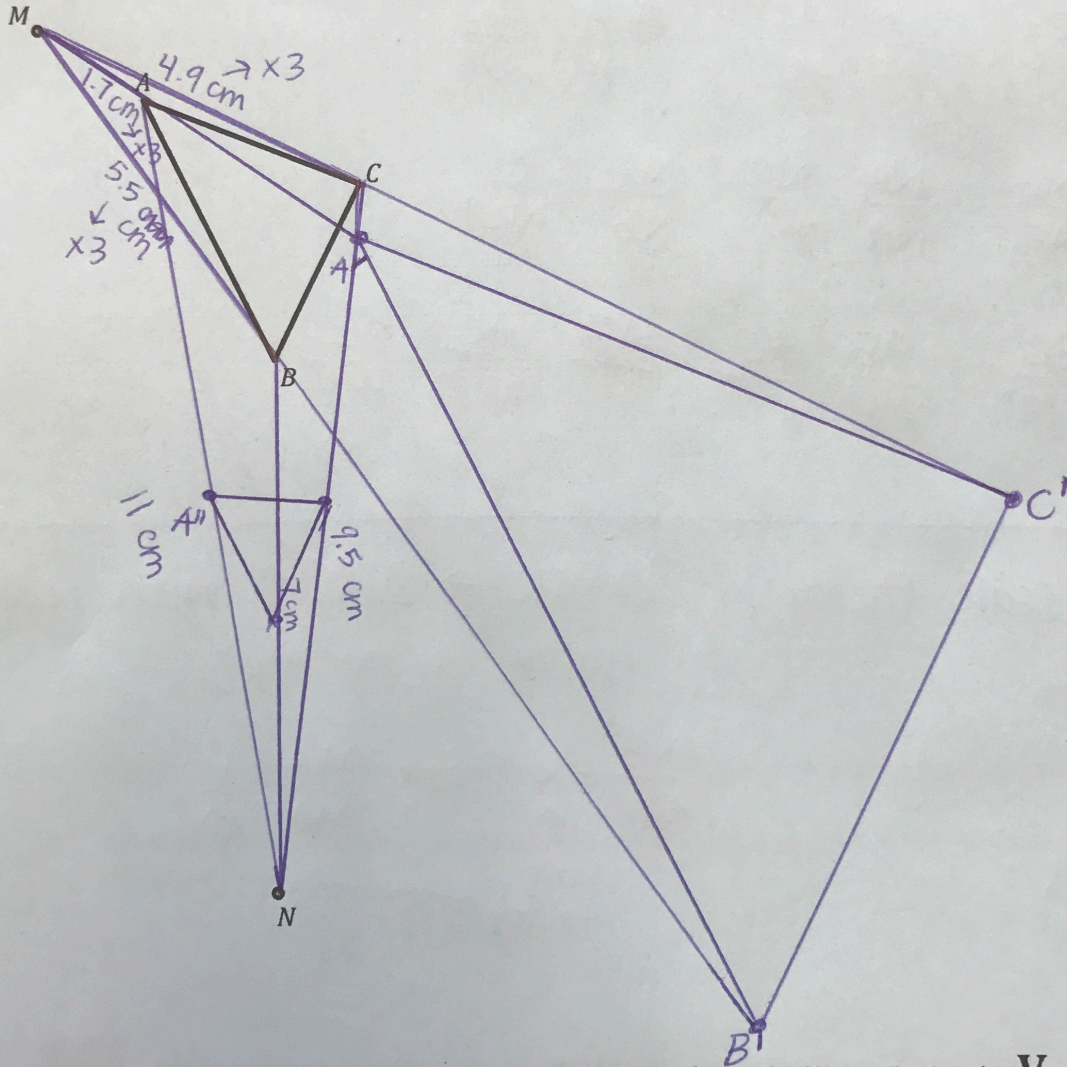
6.2 Triangle Dilations

A Solidify Understanding Task



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1. Given $\triangle ABC$, use point M as the center of a dilation to locate the vertices of a triangle that has side lengths that are three times longer than the sides of $\triangle ABC$.
2. Now use point N as the center of a dilation to locate the vertices of a triangle that has side lengths that are one-half the length of the sides of $\triangle ABC$.



3. Label the vertices in the two triangles you created in the diagram above. Based on this diagram, write several proportionality statements you believe are true. First write your proportionality statements using the names of the sides of the triangles in your ratios. Then verify that the proportions are true by replacing the side names with their measurements, measured to the nearest millimeter.

My list of proportions: (try to find at least 10 proportionality statements you believe are true)

$$\frac{MA}{MA'} = \frac{MB}{MB'} \quad \frac{MA}{MA'} = \frac{MC}{MC'} \quad \frac{MB}{MB'} = \frac{MC}{MC'}$$

$$\frac{AB}{A'B'} = \frac{BC}{B'C'} \quad \frac{AB}{A'B'} = \frac{AC}{A'C'} \quad \frac{AC}{A'C'} = \frac{BC}{B'C'}$$

$$\frac{NA}{NA''} = \frac{NB}{NB''} \quad \frac{NA}{NA''} = \frac{NC}{NC''} \quad \frac{NB}{NB''} = \frac{NC}{NC''}$$

$$\frac{AB}{A''B''} = \frac{BC}{B''C''} \quad \frac{AB}{A''B''} = \frac{AC}{A''C''} \quad \frac{AC}{A''C''} = \frac{BC}{B''C''}$$

To find scale factor: $\triangle ABC \rightarrow \triangle A'B'C'$ with center M
(primes go on top)

↓

$$\frac{A'B'}{AB} = k \quad \text{or} \quad \frac{MA'}{MA} = k$$

↑
Scale factor



4. Based on your work above, under what conditions are the corresponding line segments in an image and its pre-image parallel after a dilation? That is, which word best completes this statement?

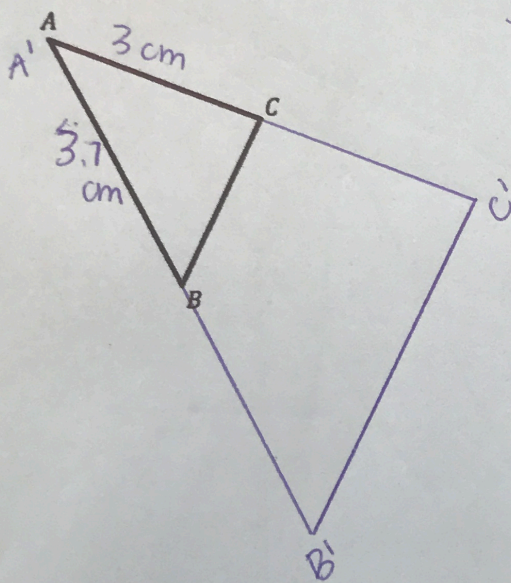
After a dilation, corresponding line segments in an image and its pre-image are [never, sometimes, always] parallel.

5. Give reasons for your answer. If you choose "sometimes", be very clear in your explanation how to tell when the corresponding line segments before and after the dilation are parallel and when they are not.

If the line doesn't go through the center point it will be parallel

If the line goes through the center point it's on the same line so

Given $\triangle ABC$, use point A as the center of a dilation to locate the vertices of a triangle that has side lengths that are twice as long as the sides of $\triangle ABC$. it is not parallel



Since $\triangle ABC$ has been scaled by 2,

$$\frac{A'B'}{AB} = 2, \frac{A'C'}{AC} = 2, \text{ so } \frac{B'C'}{BC} = 2. \text{ Thus } BC \text{ is } \frac{1}{2} \text{ of } B'C'.$$

Also, $\angle B \cong \angle B'$ and $\angle C \cong \angle C'$ therefore

$$\overline{BC} \parallel \overline{B'C'}$$

↑
parallel

6. Explain how the diagram you created above can be used to prove the following theorem:

The segment joining midpoints of two sides of a triangle is parallel to the third side and half the length.

