6. 2 Triangle Dilations

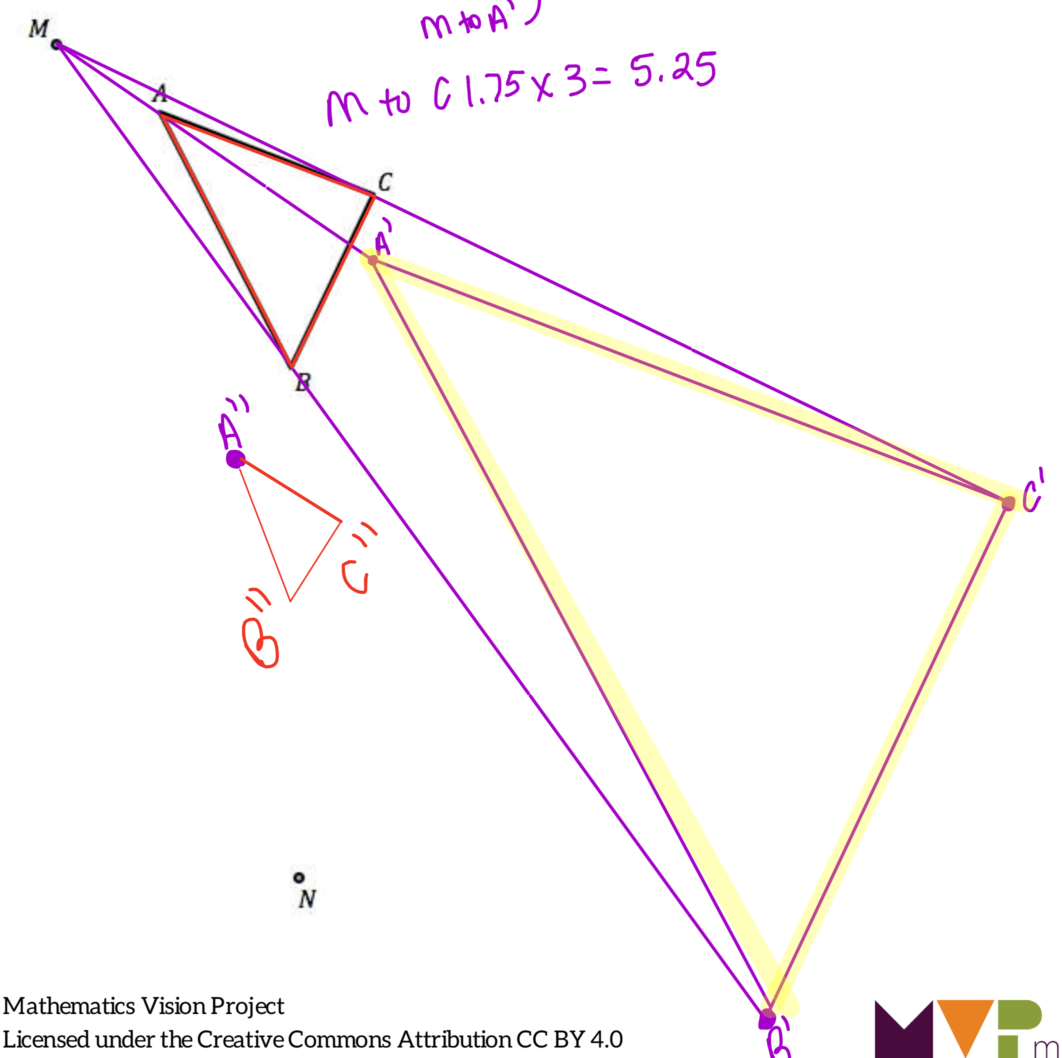
A Solidify Understanding Task

1. Given ΔABC, 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 ΔABC.

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 ΔABC.

M to A $\frac{10}{16} \times \frac{3}{1} = \frac{30}{16}$ $1\frac{14}{16}$
M to A'

M to C $1.75 \times 3 = 5.25$



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)

$$\frac{\overline{AC}}{\overline{AB}} = \frac{\overline{A'C'}}{\overline{A'B'}} \qquad \frac{MA}{MC} = \frac{MA'}{MC'}$$

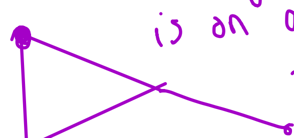
...

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?

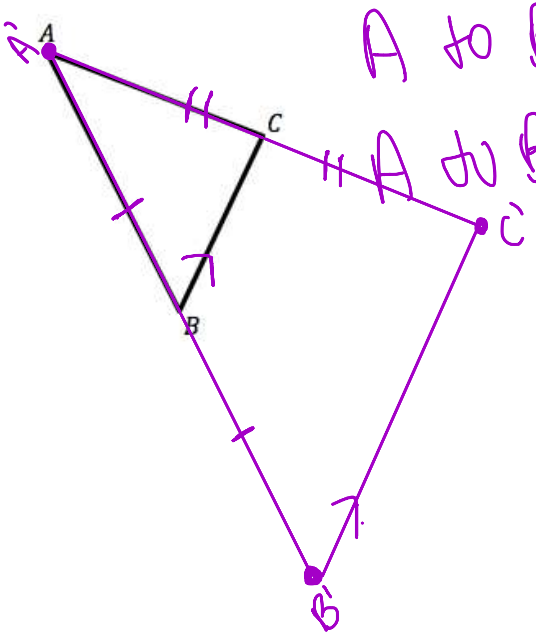
After a dilation, corresponding line segments in an image and its pre-image are [never, sometimes, always] parallel.

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

Always, except when center of dilation is on a given point of the pre-image to be dilated



Given ΔABC, 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 ΔABC.



A to B = $1\frac{1}{2}$ A to C = $1\frac{1}{8}$ = $2\frac{1}{4}$

A to B' = 3 A to C'

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.

Dilations preserve ∠ measure. B is midpoint of $\overline{A'B'}$, C is midpoint of $\overline{A'C'}$. Since Dilations presere ∠ measure ∠ABC ≅ ∠AB'C' and ∠ACB ≅ ∠AC'B. Thus is parrallel + half length