(DN) When things are **proportional** they have equal ratios. Copy the equation and use a calculator (or simplify) to verify that the values are **proportional** as the equation suggests.

$$\frac{10}{15}=\frac{2}{3}=\frac{18}{27}$$

Name ______________________________**Per**______

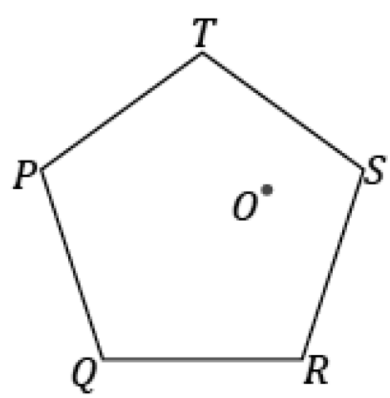
LO: I can show how the parallel method and ratio method lead to one another and to the side splitter theorem. I can use and explain the side splitter theorem.

☐ (1) **The parallel method** Fractional scale factors

ruler and setsquare

☐ (a)

With a ruler and setsquare, use the parallel method to create a scale drawing of pentagon $PQRST$ about center O with scale factor $\frac{5}{2}$. Verify that the resulting figure is in fact a scale drawing by showing that corresponding side lengths are in constant proportion and that corresponding angles are equal in measurement.

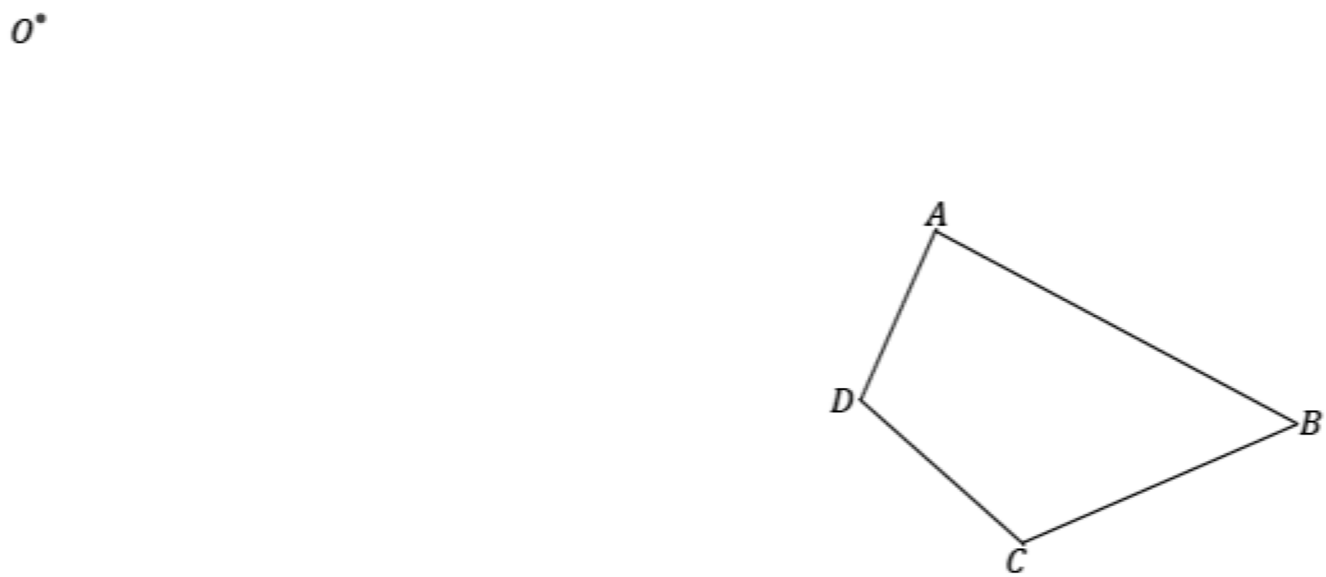


☐ (1) **The parallel method** Fractional scale factors

cont. ruler and setsquare

☐ (b)

With a ruler and setsquare, use the parallel method to create a scale drawing of quadrilateral $ABCD$ about center O with scale factor $r = \frac{3}{4}$. Verify that the resulting figure is in fact a scale drawing by showing that corresponding side lengths are in constant proportion and that the corresponding angles are equal in measurement.

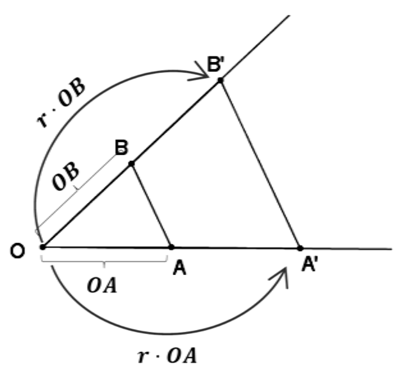


☐ (2) **Proof that the ratio and parallel methods produce the same scale drawing**

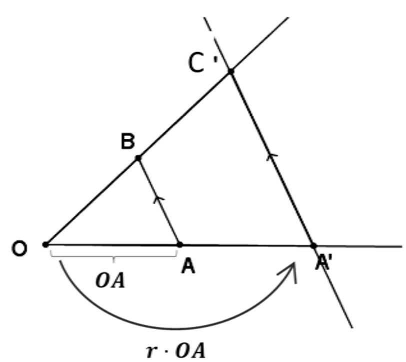
3 pages for proof, 6 different colors of highlighters

To prove that the ratio and parallel methods produce the same scale drawing, we must show that the parallel method result is the same as the ratio result AND the ratio result is the same as the parallel result. We will look at scaling a segment:

(a) by the parallel method and showing the result is the same as the ratio method. (3 separate pages)
(b) by the ratio method and showing the result is the same as the parallel method. (below)



The ratio method



The parallel method

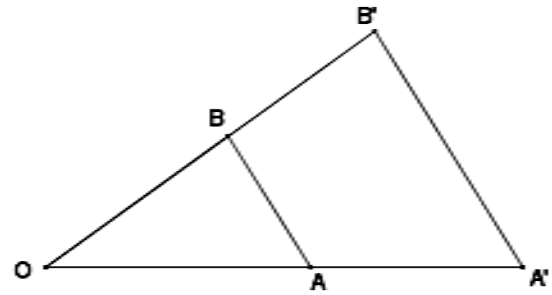
The diagram above shows the ratio and parallel methods. In #2a, we showed that the parallel method gives the same result as the ratio method. So, from the diagram $\frac{rOB}{OB} = \frac{rOA}{OA}$ and. OB' = rOA and OC = rOA so A'C is the same result as A'B' which means that the ratio and parallel methods produce the same result.

☐ (3) **Side Splitter Theorem**

highlighter ☐ (a) Read the statement of the side splitter and use the diagram to make sense of it. Complete the steps below to help you.

Restatement of the triangle side splitter theorem:

In $\triangle OA'B'$, $\overline{AB}$ splits the sides proportionally (i.e., $\frac{OA'}{OA} = \frac{OB'}{OB}$)
if and only if $\overline{A'B'} \parallel \overline{AB}$.



☐ (b) Trace the "side splitter" in the diagram above with a highlighter. (Hint, which segment "splits" or divides sides of a triangle into smaller segments?)

☐ (c) The side splitter (segment ________) is parallel to segment ________.

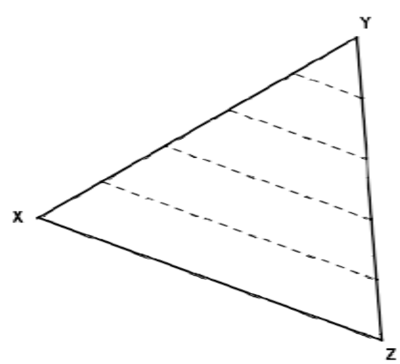
☐ (d) Because a side splitter results in a scale drawing: $\frac{OA'}{OA}$ = ______ = ______

Lesson Summary

THE TRIANGLE SIDE SPLITTER THEOREM: A line segment splits two sides of a triangle proportionally if and only if it is parallel to the third side.

☐ (3) **Side Splitter Theorem: using it to answer questions and solve problems**

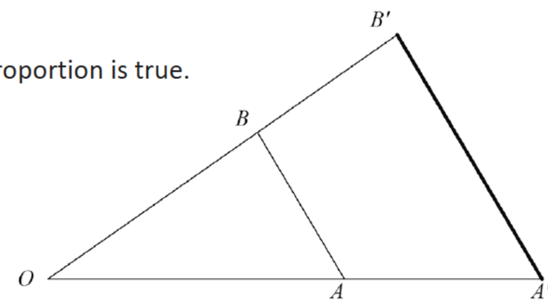
Given $\triangle XYZ$, $\overline{XY}$ and $\overline{YZ}$ are partitioned into equal length segments by the endpoints of the dashed segments as shown. What can be concluded about the diagram?



☐ (4) **Side Splitter Theorem: using it to answer questions and solve problems**

ruler

Use the diagram to answer each part below.



a. Measure the segments in the figure below to verify that the proportion is true.

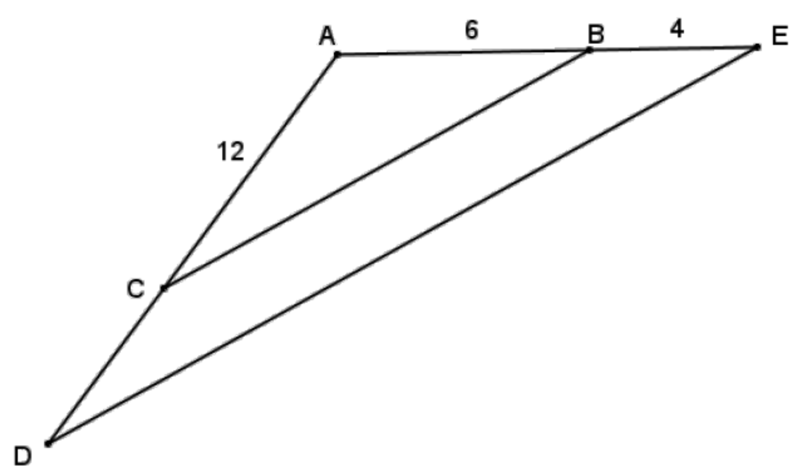
$$\frac{OA'}{OA} = \frac{OB'}{OB}$$

b. Is the proportion $\frac{OA}{OA'} = \frac{OB}{OB'}$ also true? Explain algebraically.

c. Is the proportion $\frac{AA'}{OA'} = \frac{BB'}{OB'}$ also true? Explain algebraically.

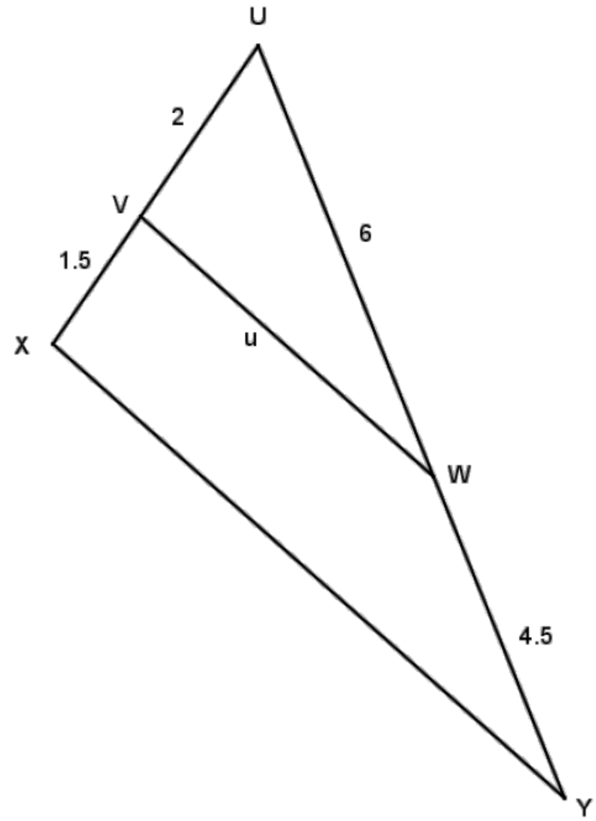
☐ (5) **Side Splitter Theorem: using it to answer questions and solve problems**

Given the diagram, $AC = 12$, $AB = 6$, $BE = 4$, $\angle ACB = x°$, and $\angle D = x°$, find CD.



☐ (6) Scale drawings using the parallel method

What conclusions can be drawn from the diagram shown to the right? Explain.

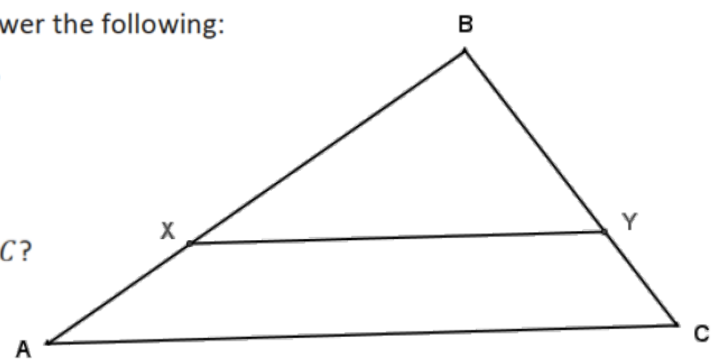


☐ (7) Exit Ticket

In the diagram, $\overline{XY} \parallel \overline{AC}$. Use the diagram to answer the following:

1. If $BX = 4$, $BA = 5$, and $BY = 6$, what is BC?

2. If $BX = 9$, $BA = 15$, and $BY = 15$, what is YC?

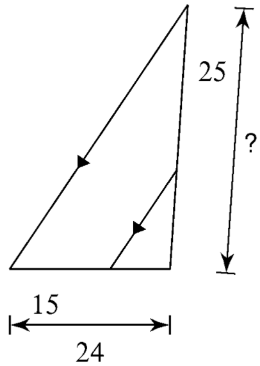


Not drawn to scale

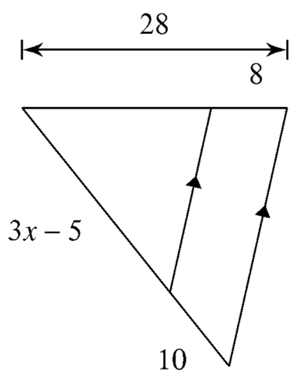
☐ (8) compass, straightedge

Homework:

☐ (1) Find the measure of the segment with the question mark.



☐ (2) Find the value of x.



☐ (2) Construct a 30° angle. Try on your own first, then see the hint at the bottom of the page.

(Hint: construct an equilateral triangle and bisect an angle.)