Lesson 7-6R / 7.7L: Splitters

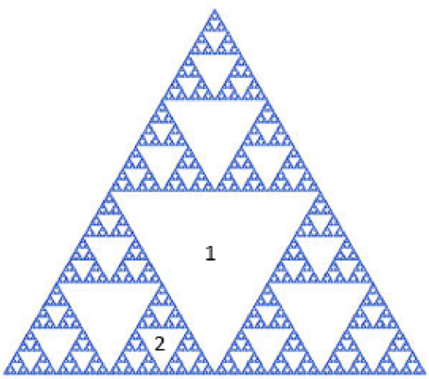
Agenda

- Check & Review HW 7.6
- 7-6 Exploration and Guided Notes

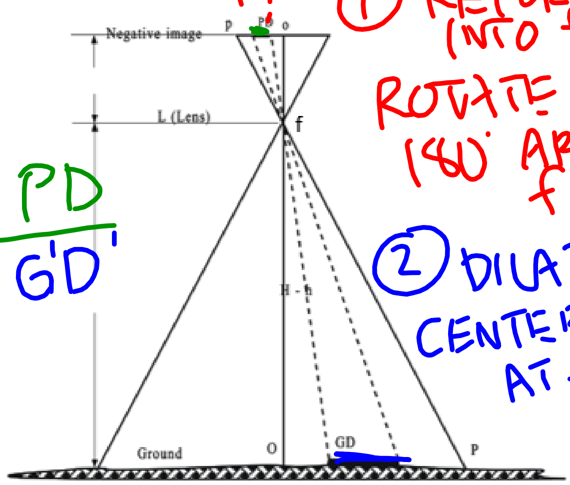
Homework:

- Text page 485 # 8,9,14,15-20, 28, 32, Extra Credit # 39 (submit on separate paper)
- Extra credit in the notes

5) Here is a Sierpinski Triangle, which has self-similarity. Identify a precise sequence of transformations that would map triangle 1 onto 2.



6) Here is the geometry behind determining the scale of a photograph through a lens focal point f. Identify the precise sequence of transformations that would map the segment labeled "GD" onto the segment labeled "PD". State the scale factor as a ratio.

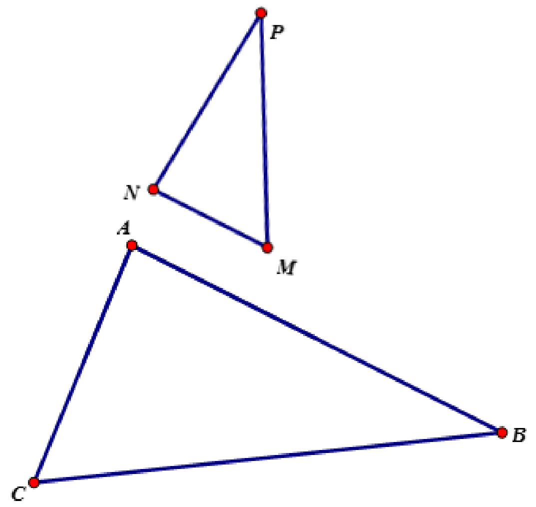


$\frac{PD}{G'D'}$

① REFLECT INTO f
ROTATE 180° AROUND f.

② DILATE CENTERED AT f

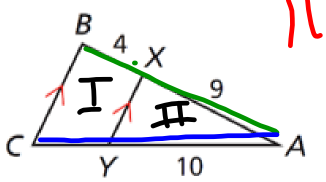
7) Identify a precise sequence of transformations to map ΔABC onto ΔNPM. Note – you can use a construction to determine the scale factor to ensure the triangles are similar by $SSS \sim$. Be sure to sketch each step.



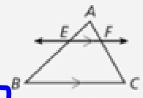
7- 6R & 7-7L Notes: Applying properties of similar triangles - Splitters

EXAMPLE 1 Finding the Length of a Segment

Find CY. 11✓



Theorem 7-4-1 Triangle Proportionality Theorem

THEOREM	HYPOTHESIS	CONCLUSION
If a line parallel to a side of a triangle intersects the other two sides, then it divides those sides proportionally.	 $\overline{EF} \parallel \overline{BC}$	$\frac{AE}{EB} = \frac{AF}{FC}$

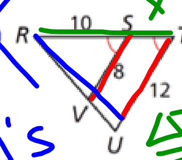
$$\frac{\mathrm{I}}{\mathrm{II}} : \boxed{\frac{4}{9}} = \boxed{\frac{CY}{10}}$$

$$4 \cdot 10 = 9(CY)$$

$$\frac{40}{9} = CY$$

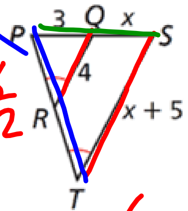
Are the expressions / numbers on the parallel segments? If so, use $\frac{\Delta I}{\Delta II}$ from similar triangles!

Which of the following are cases of side splitters?

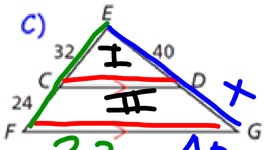
A)


$\sim \Delta$'s AA~

$\frac{\Delta I}{\Delta II} : \frac{10}{10+x} = \frac{8}{12}$

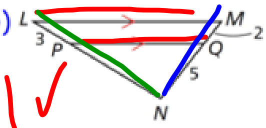
B)


|| ✓

C)


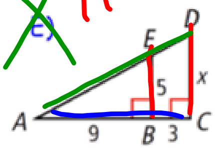
|| ✓

$\frac{I}{II} : \frac{32}{24} = \frac{40}{x}$

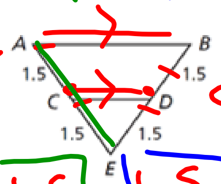
D)


|| ✓

SIDE SPLIT ✓

E)


|| ✓

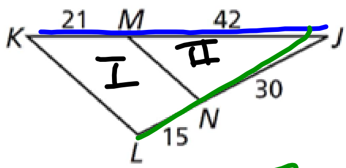
F)


|| ✓ SAS~

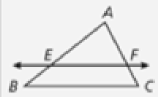
$\boxed{\frac{1.5}{1.5}} = \boxed{\frac{1.5}{1.5}}$

EXAMPLE 2 Verifying Segments are Parallel

Verify that $\overline{MN} \parallel \overline{KL}$.



Theorem 7-4-2 Converse of the Triangle Proportionality Theorem

THEOREM	HYPOTHESIS	CONCLUSION
If a line divides two sides of a triangle proportionally, then it is parallel to the third side.	$\frac{AE}{EB} = \frac{AF}{FC}$ 	$\overleftrightarrow{EF} \parallel BC$

Note that this would get you angles towards AA~ criteria or you can use SAS~ w/the reflexive angle.

$\frac{I}{II} : \boxed{\frac{15}{30}} = \boxed{\frac{21}{42}}$

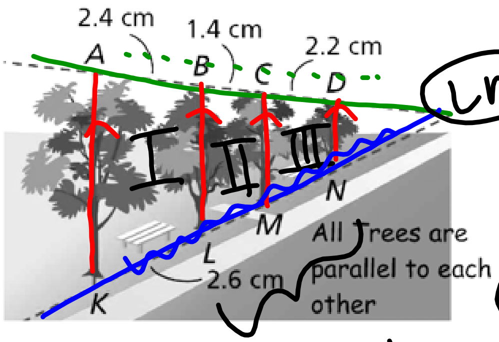
$\frac{1}{2} = \frac{1}{2}$

OR $15 \cdot 42 = 30 \cdot 21$

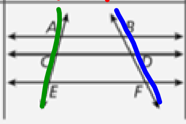
$630 = 630$

SINCE $\overline{MN}$ SPLITS THE SIDES OF ΔKJL PROPORTIONALLY, THEN $\overline{MN} \parallel \overline{KL}$.

EXAMPLE 3 Find LM, MN, LN



Corollary 7-4-3 Two-Transversal Proportionality

THEOREM	HYPOTHESIS	CONCLUSION
If three or more parallel lines intersect two transversals, then they divide the transversals proportionally.		$\frac{AC}{CE} = \frac{BD}{DF}$

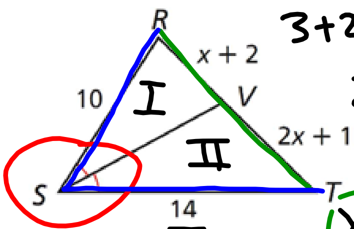
$$\frac{I}{II}: \boxed{\frac{2.4}{1.4}} = \boxed{\frac{2.6}{LM}}$$

$$\frac{I}{III}: \boxed{\frac{2.4}{2.2}} = \boxed{\frac{2.6}{MN}}$$

LM + MN
SEG ADD POST

EXAMPLE 4 Using the Triangle Angle Bisector Theorem

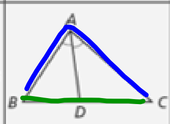
Find RV and VT.



$3+2=5=RV$

$2(3)+1$
$7=VT$

Theorem 7-4-4 Triangle Angle Bisector Theorem

THEOREM	HYPOTHESIS	CONCLUSION
An angle bisector of a triangle divides the opposite side into two segments whose lengths are proportional to the lengths of the other two sides. (△ ∠ Bisector Thm.)		$\frac{BD}{DC} = \frac{AB}{AC}$

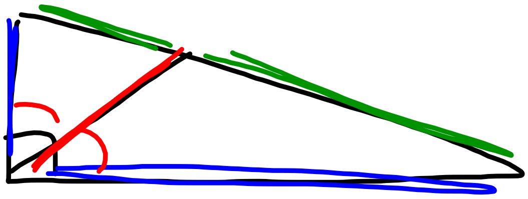
$$\frac{I}{II}: \boxed{\frac{x+2}{2x+1}} = \boxed{\frac{10}{14}}$$

$14(x+2) = 10(2x+1)$

$14x+28 = 20x+10$

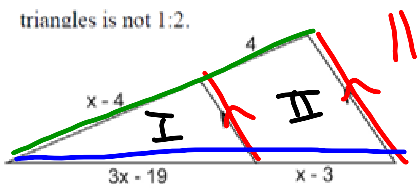
$18 = 6x$

$3 = x$



MIXED PRACTICE

1. Find x. Assume the ratio of similitude of the triangles is not 1:2.

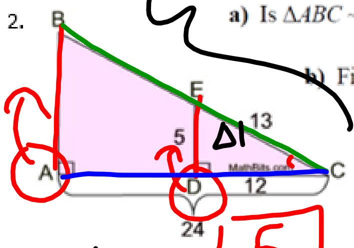


∥✓

$$\frac{I}{II}: \quad \frac{x-4}{4} = \frac{3x-19}{x-3}$$

$\Delta 2$

2.



a) Is $\Delta ABC \sim \Delta DEC$? YES AA~

b) Find AB.

c) Which proportion is true in relation to these Δs?

(1) $\frac{DE}{AB} = \frac{CD}{AD}$ AC

(2) $\frac{DE}{AB} = \frac{ED}{BE}$

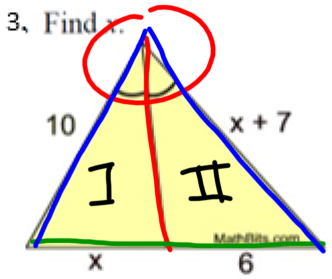
(3) $\frac{DE}{AB} = \frac{DC}{AC}$

(4) $\frac{CE}{BE} = \frac{CD}{AC}$ $\frac{\Delta 1}{\Delta 2}$

BC

$$\frac{\Delta 1}{\Delta 2}: \boxed{\frac{5}{AB}} = \boxed{\frac{12}{24}}$$

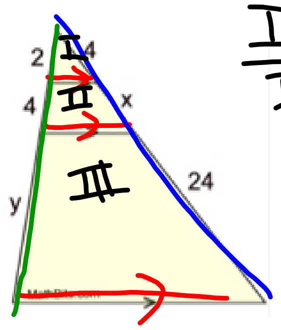
3. Find x.



$$\frac{I}{II}: \boxed{\frac{x}{6}} = \boxed{\frac{10}{x+7}}$$

|| ✓

4. a) Find x.



b) Find y.

$\frac{\text{I}}{\text{II}}: \boxed{\frac{2}{4}} = \boxed{\frac{4}{x}}$

$\frac{\text{II}}{\text{III}}: \boxed{\frac{4}{y}} = \boxed{\frac{x}{24}}$

OR $\frac{\text{I}}{\text{III}}$

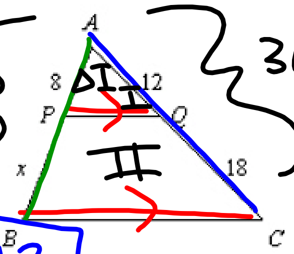
5. Given $\overline{PQ} \parallel \overline{BC}$, write the following proportions to solve for x using:

AA~ Similar Triangles vs Side Splitter Theorem || ✓

$\frac{\Delta \text{I}}{\Delta \text{II}}: \boxed{\frac{8}{x+8}} = \boxed{\frac{12}{30}}$

ΔII

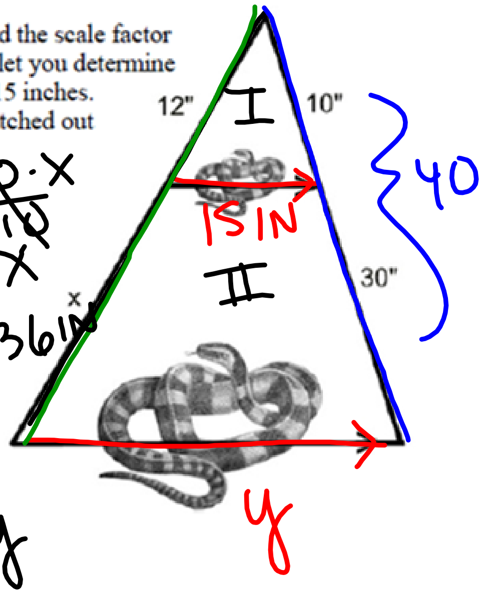
$x+8$



30

$\frac{\text{I}}{\text{II}}: \boxed{\frac{8}{x}} = \boxed{\frac{12}{18}}$

6. The "Giant Snake Grow" package is damaged and you cannot read the scale factor for the growth of the snake. The diagram at the right will, however, let you determine the growth factor. When stretched out, the original snake measures 15 inches. Assume that the two snakes in the diagram represent the original stretched out snake and the stretched out snake after the growth process.



a) Find x in the diagram.

$\frac{I}{II} : \boxed{\frac{12}{x}} = \boxed{\frac{10}{30}}$

$\frac{30 \cdot 12}{10} = \frac{\cancel{10} \cdot x}{\cancel{10}}$

$36 = x$

b) Find the scale factor for the growth of the snake.

$\frac{\Delta I}{\Delta II} : \boxed{\frac{15}{y}} = \boxed{\frac{10}{40}}$

SIM RATIO $= \frac{1}{4}$

36 IN

K = 4

c) Find the length of the snake at the end of the growth process.

$40 \cdot 15 = 10 \cdot y$

$\frac{40 \cdot 15}{\cancel{10}} = y$

$60 \text{ IN} = y$

Extra Credit: Solve for the variables.