Geometry CC – Unit 7
Lesson 4: Side Splitters & Families of // Lines
M2 L4 & L19

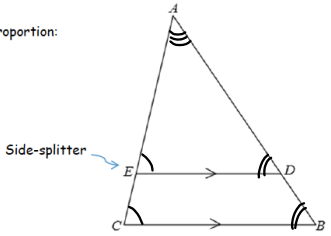
Welcome Back!

Side-Splitters

A Side-Splitter is a line that intersects 2 sides of a triangle and is also parallel to the 3rd side.

If $\Delta ABC \sim \Delta ADE$, list the sides in proportion:

$\frac{AB}{AD} = \frac{BC}{DE} = \frac{AC}{AE}$



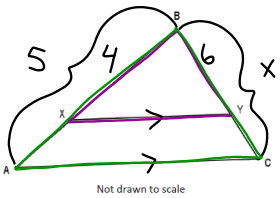
Triangle side splitter theorem:
A line segment splits two sides of a triangle proportionally if and only if it is parallel to the third side.

Dec 30-8:32 PM

Examples

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?



Not drawn to scale

$\frac{4}{5} = \frac{6}{X}$

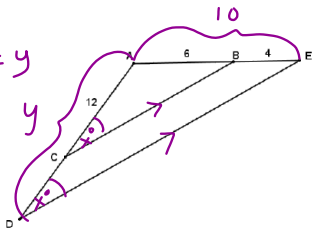
$\frac{4X}{4} = \frac{30}{4}$

$X = 7.5$

$BC = 7.5$

Dec 30-8:33 PM

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



$\frac{12}{y} = \frac{6}{10}$

$120 = 6y$

$y = 20$

$AD = y$

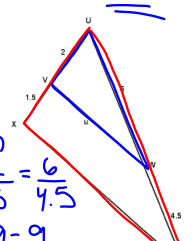
$20\ y$

$CD = 20 - 12 = 8$

Dec 30-8:33 PM

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

a) are the Δ's $\sim$?
b) is $\overline{VW} \parallel \overline{XY}$



*Set up a proportion

$\frac{2}{3.5} = \frac{6}{10.5}$

$21 = 21$ ✓

$\frac{2}{1.5} = \frac{6}{4.5}$

$9 = 9$

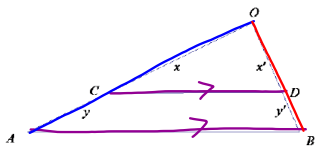
Sides are in proportion,
∴ Δ's are similar and
$\overline{VW} \parallel \overline{XY}$

Dec 30-8:33 PM

Families of Parallel Lines

Theorem: Parallel lines cut transversals into proportional segments. If parallel lines are intersected by two transversals, then the ratios of the segments determined along each transversal between the parallel lines are equal.

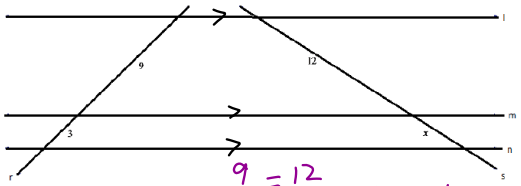
$\frac{x}{y} = \frac{x'}{y'}$



Dec 30-8:34 PM

Examples:

1) In the given diagram, lines l, m, and n are all parallel and are cut by transversals r and s. Find the value of x.



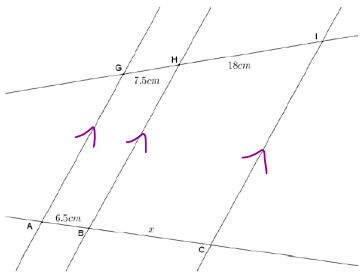
$\frac{9}{3} = \frac{12}{x}$

$9x = 36$

$x = 4$

Dec 30-8:34 PM

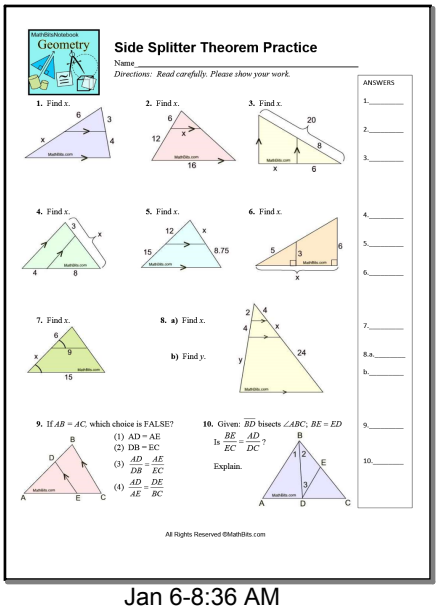
2) Given the diagram to the right, $\overline{AG} \parallel \overline{BH} \parallel \overline{CI}$, $AB = 6.5$ cm, $GH = 7.5$ cm, and $HI = 18$ cm, find BC.



$\frac{7.5}{18} = \frac{6.5}{x}$

$x = 15.6$

Dec 30-8:34 PM



Side Splitter Theorem Practice

Name

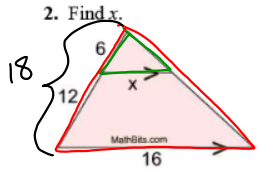
Directions: Read carefully. Please show your work.

ANSWERS

1. Find x.
2. Find x.
3. Find x.
4. Find x.
5. Find x.
6. Find x.
7. Find x.
8. a) Find x.
   b) Find y.
9. If $AB = AC$, which choice is FALSE?
   (1) AD = AE
   (2) DB = EC
   (3) $\frac{AD}{DB} = \frac{AE}{EC}$
   (4) $\frac{AD}{AE} = \frac{DE}{BC}$
10. Given: $\overline{BD}$ bisects $\angle ABC$; $BE = ED$
    Is $\frac{BE}{EC} = \frac{AD}{DC}$?
    Explain.

All Rights Reserved ©MathBits.com

Jan 6-8:36 AM



$\frac{\text{little side}}{\text{little base}} = \frac{\text{Big Side}}{\text{Big Base}}$

$\frac{6}{x} = \frac{18}{16}$

Jan 6-12:19 PM