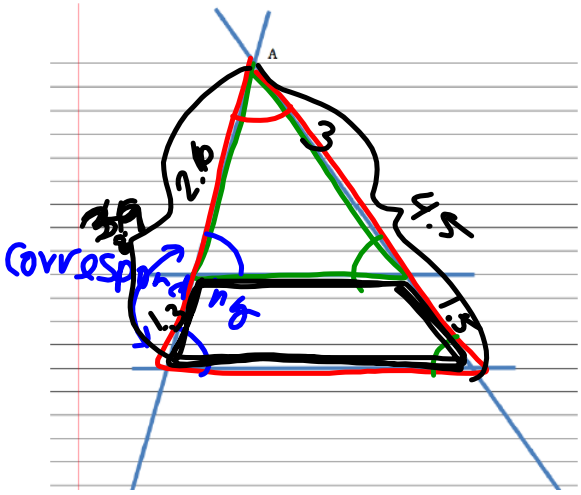
6. 4 Cut by a Transversal

A Solidify Understanding Task

HW: 6.3 + 6.4

Start on 6.4 lesson, get a ruler

Draw two intersecting transversals on a sheet of lined paper, as in the following diagram. Label the point of intersection of the transversals *A*. Select any two of the horizontal lines to form the third side of two different triangles.



1. What convinces you that the two triangles formed by the transversals and the horizontal lines are similar?

AAA, they are the same shape but different sizes.

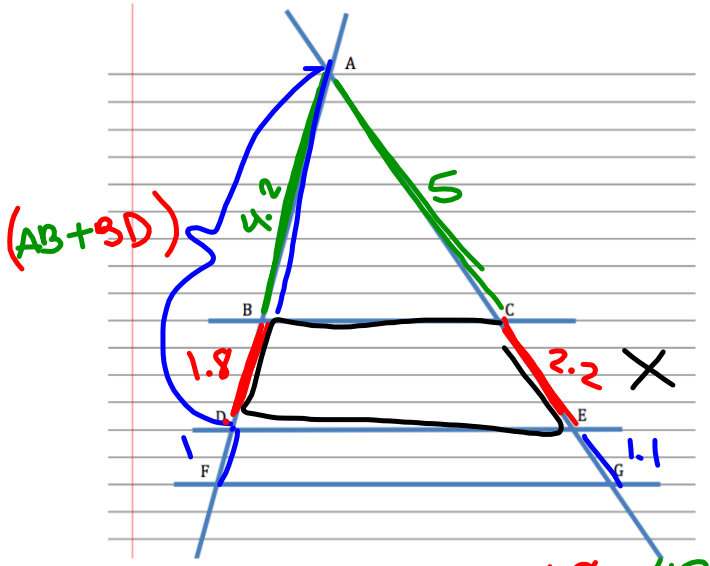
2. Label the vertices of the triangles. Write some proportionality statements about the sides of the triangles and then verify the proportionality statements by measuring the sides of the triangles.

$\frac{3}{4.5} = \frac{2.6}{3.9}$ $.6 = .6$ | $\frac{1.5}{3} = \frac{1.3}{2.6}$ $.5 = .5$ ✓

3. Select a third horizontal line segment to form a third triangle that is similar to the other two. Write some additional proportionality statements and verify them with measurements.

Tristan has written this proportion for question 3, based on his diagram below: $\frac{BD}{AB} = \frac{CE}{AC}$

Tia thinks Tristan's proportion is wrong, because some of the segments in his proportion are not sides of a triangle.



4. Check out Tristan's idea using measurements of the segments in his diagram at the left.

5. Now check out this same idea using proportions of segments from your own diagram. Test at least two different proportions, including segments that do not have *A* as one of their endpoints.

6. Based on your examples, do you think Tristan or Tia is correct?

~not convinced. Tristan.

Tia still isn't convinced, since Tristan is basing his work on a single diagram. She decides to start with a proportion she knows is true: $\frac{AD}{AB} = \frac{AE}{AC}$. (Why is this true?)

Tia realizes that she can rewrite this proportion as $\frac{AB+BD}{AB} = \frac{AC+CE}{AC}$ (Why is this true?)

Can you use Tia's proportion to prove algebraically that Tristan is correct?

Ex $\frac{2+a}{2}$

$\frac{2}{2} + \frac{a}{2}$

$1 + \frac{a}{2} = 1 + \frac{b}{2}$

$\frac{AB+BD}{AB} = \frac{AC+CE}{AC}$

$\frac{AB}{AB} + \frac{BD}{AB} = \frac{AC}{AC} + \frac{CE}{AC}$

$\frac{BD}{AB} = \frac{CE}{AC}$

Tristan is correct

SECONDARY MATH II // MODULE 6
SIMILARITY & RIGHT TRIANGLE TRIGONOMETRY – 6.4

6.4

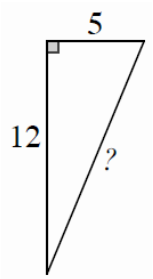
READY, SET, GO! Name Period Date

READY

Topic: Pythagorean theorem and proportions in similar triangles.

Find the missing side in each right triangle NO decimals

1.



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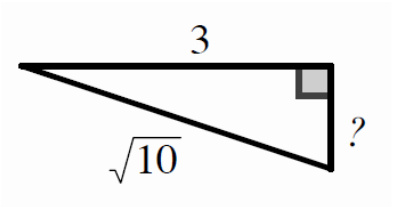

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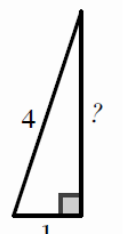

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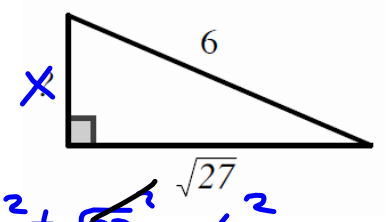


$x^2 + \sqrt{27}^2 = 6^2$

$x^2 + 27 = 36$

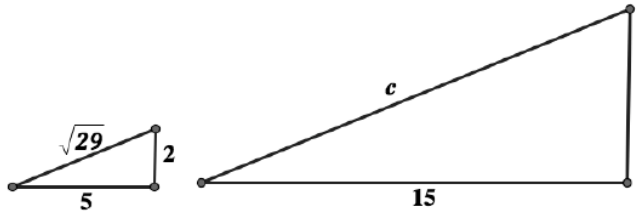
$-27 \quad -27$

$\sqrt{x^2} = \sqrt{9}$

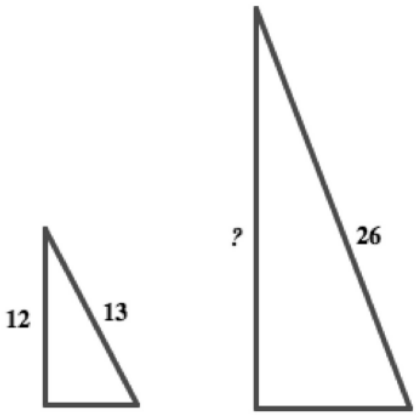
$x = 3$

Create a proportion for each set of similar triangles. Then solve the proportion.

5.



6.

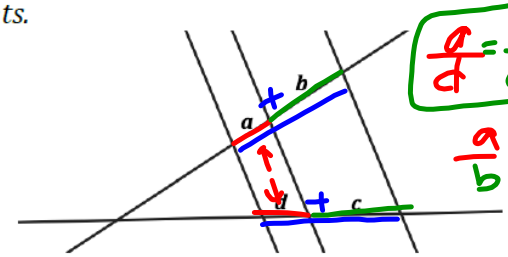


SET

Topic: Proportionality of transversals across parallel lines

For questions 7 and 8, write three equal ratios.

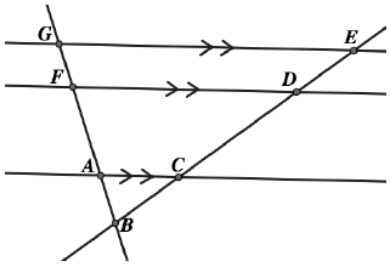
7. *The letters a,b,c and d represent lengths of line segments.*



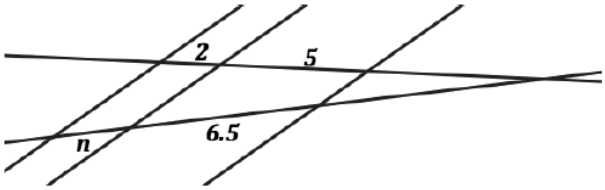
$\frac{a}{d} = \frac{b}{c} = \frac{a+b}{d+c}$

$\frac{a}{b} = \frac{d}{c}$ also true

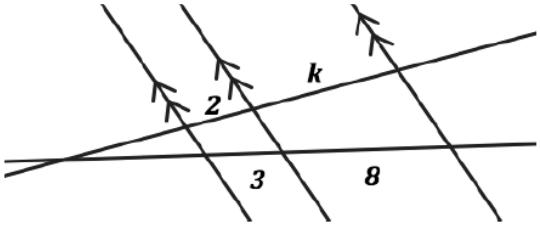
8.



9. Write and solve a proportion that will provide the missing length.

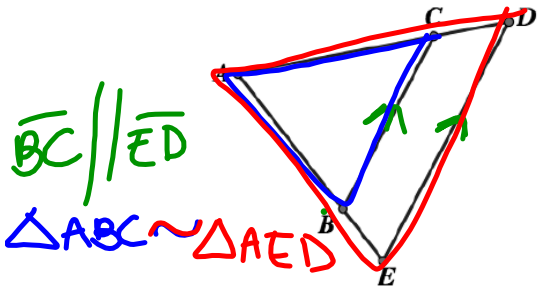


10. Write and solve a proportion that will provide the missing length.



For questions 11 – 14 find and label the parallel lines. (i.e. $\overline{AB} \parallel \overline{CD}$) Then write a similarity statement for the triangles that are similar. (i.e. $\Delta\, ABC \sim \Delta\, XYZ$)

11.



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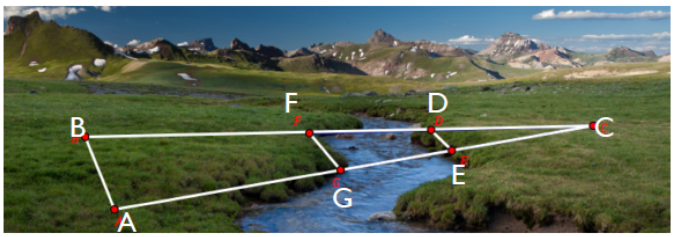

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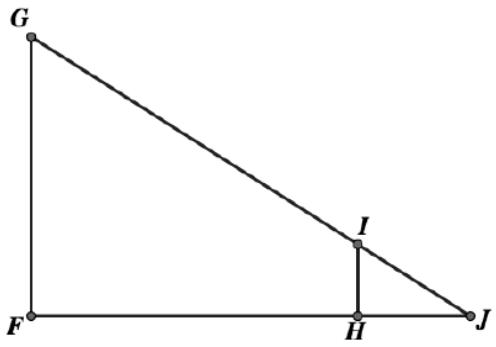

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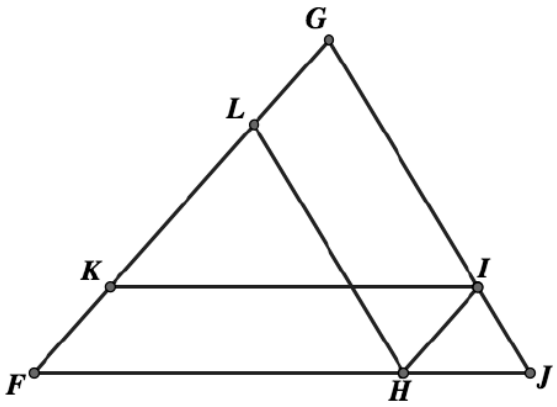
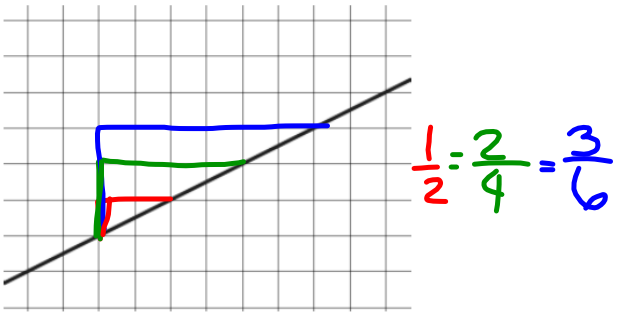


GO

Topic: Similarity in slope triangles

Each line below has several triangles that can be used to determine the slope. Draw in three slope-defining triangles of different sizes for each line and then create the ratio of rise to run for each.

15.



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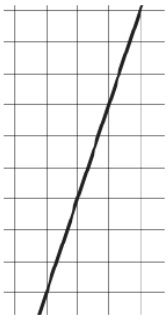

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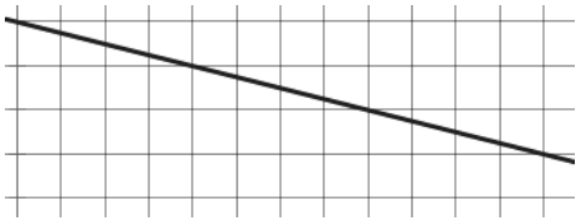

18.