

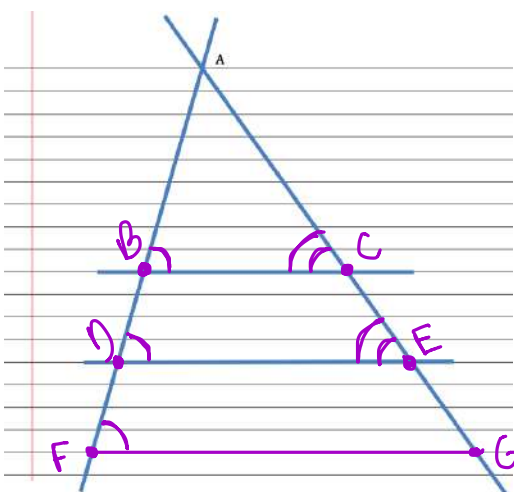


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6.4 Cut by a Transversal

A Solidify Understanding Task

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?

Horizontal lines are parallel
 $\rightarrow \angle B \cong \angle D$ by corresponding \angle 's

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.

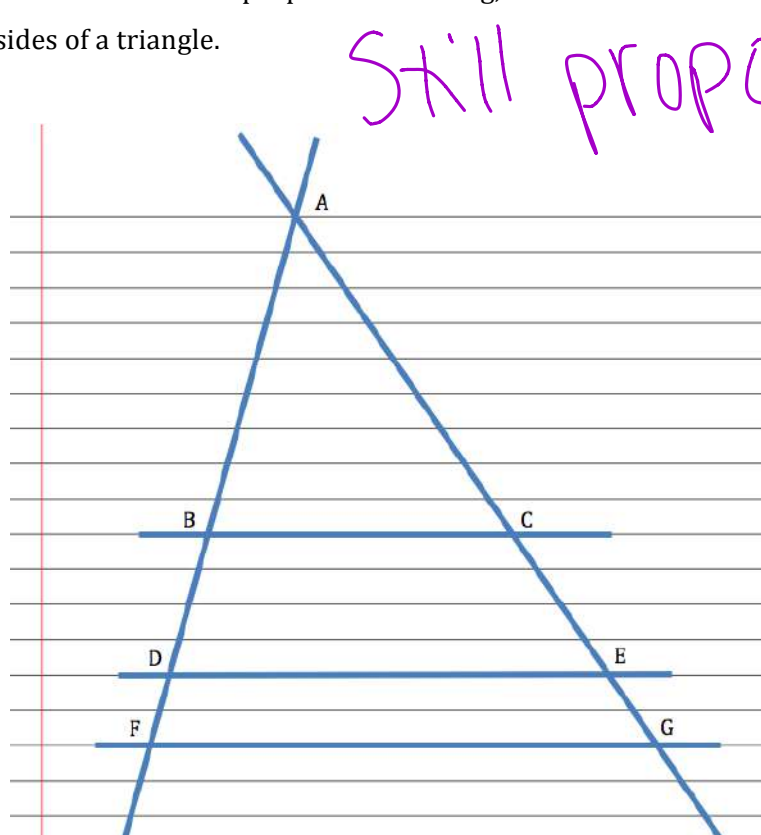
* Must be ENTIRE SIDE *

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

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?

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?

Correct

READY, SET, GO!

Name

Period

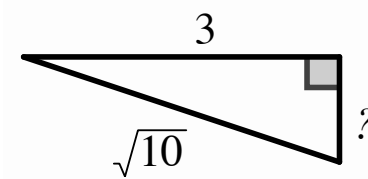
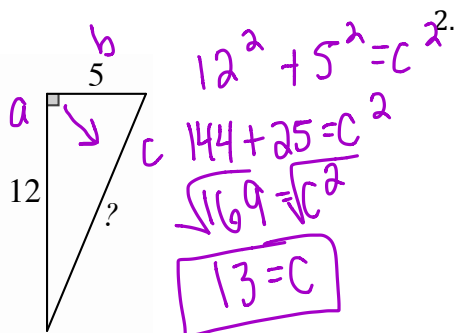
Date

READY

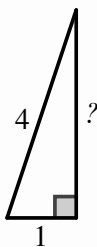
Topic: Pythagorean theorem and proportions in similar triangles.

Find the missing side in each right triangle $a^2 + b^2 = c^2$

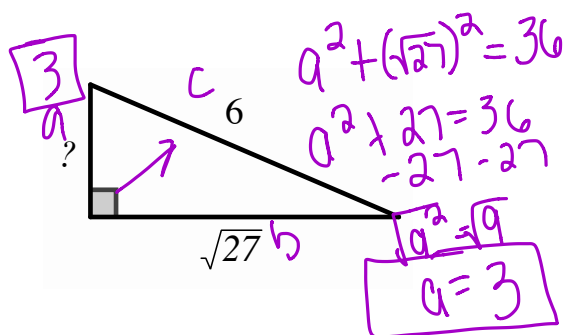
1.



3.

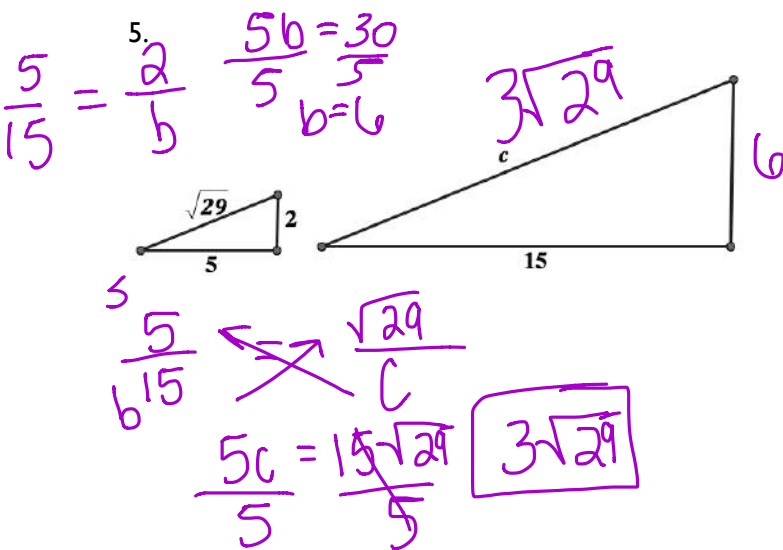


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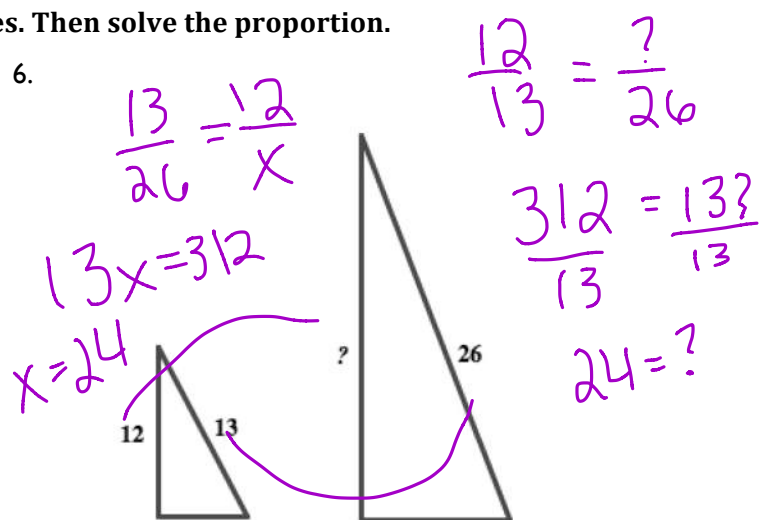


Create a proportion for each set of similar triangles. Then solve the proportion.

5.



6.



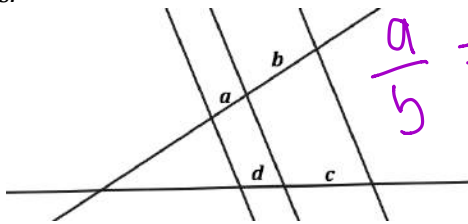
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SET

Topic: Proportionality of transversals across parallel lines

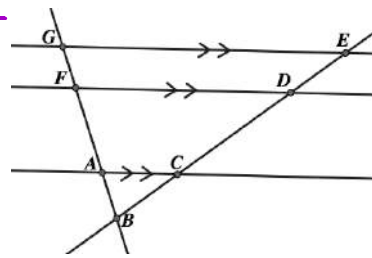
For questions 7 and 8, write three equal ratios.

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



Handwritten: $\frac{a}{5} = \frac{d}{c} = \frac{b}{d} = \frac{a}{d}$

8.

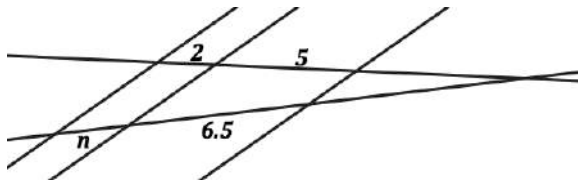


Handwritten: $\frac{AF}{AG} = \frac{CD}{CE}$

Handwritten: $\frac{BA}{BB} = \frac{BC}{BE}$

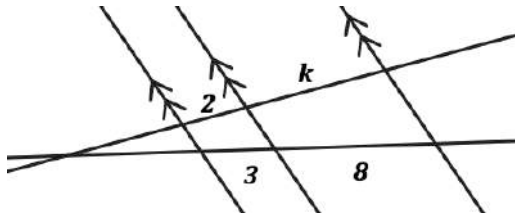
Handwritten: $\frac{ED}{EB} = \frac{GF}{GB}$

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



Handwritten: $\frac{5}{6.5} = \frac{2}{n}$
 $\frac{5n}{5} = \frac{13}{5} \Rightarrow n = 2.6$
 $\frac{2}{5} = \frac{n}{6.5} \Rightarrow n = 2.6$
 $\frac{13}{5} = \frac{5n}{5} \Rightarrow n = 2.6$

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



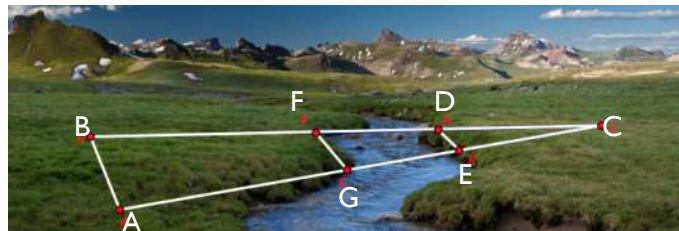
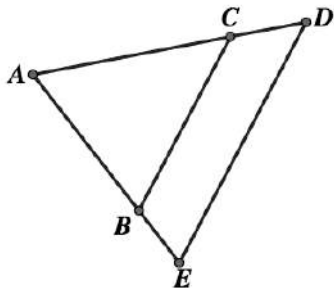
Handwritten: $\frac{2}{3} = \frac{k}{8} \Rightarrow k = \frac{16}{3}$
 $\frac{16}{3} = \frac{3k}{3}$

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. $\triangle ABC \sim \triangle XYZ$)

11.

12.

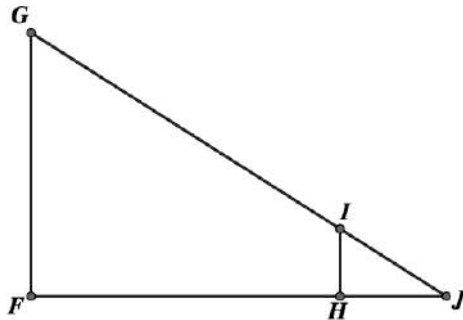
Handwritten: $\overline{BC} \parallel \overline{DE}$
 $\triangle ABC \sim \triangle AED$



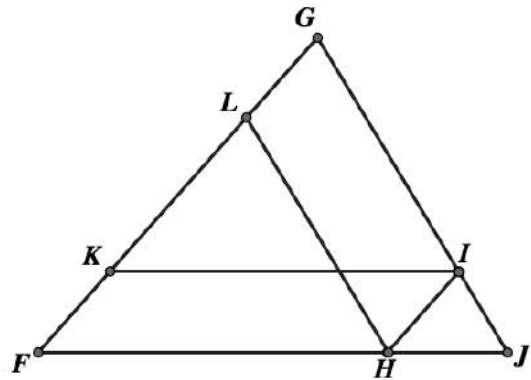
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13.



14.

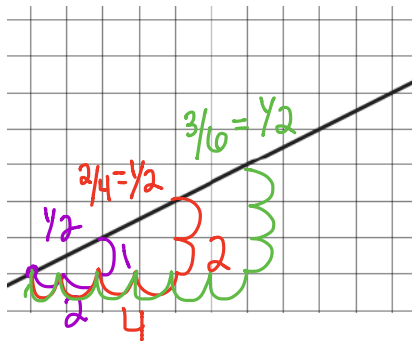


GO

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.

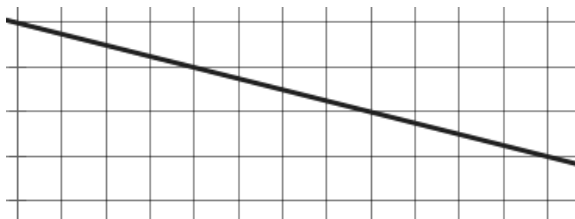
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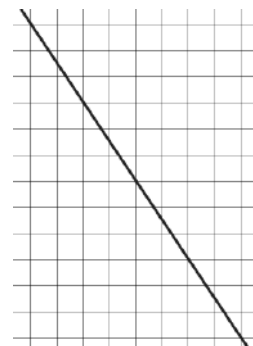
16.



17.



18.



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6.5 Measured Reasoning

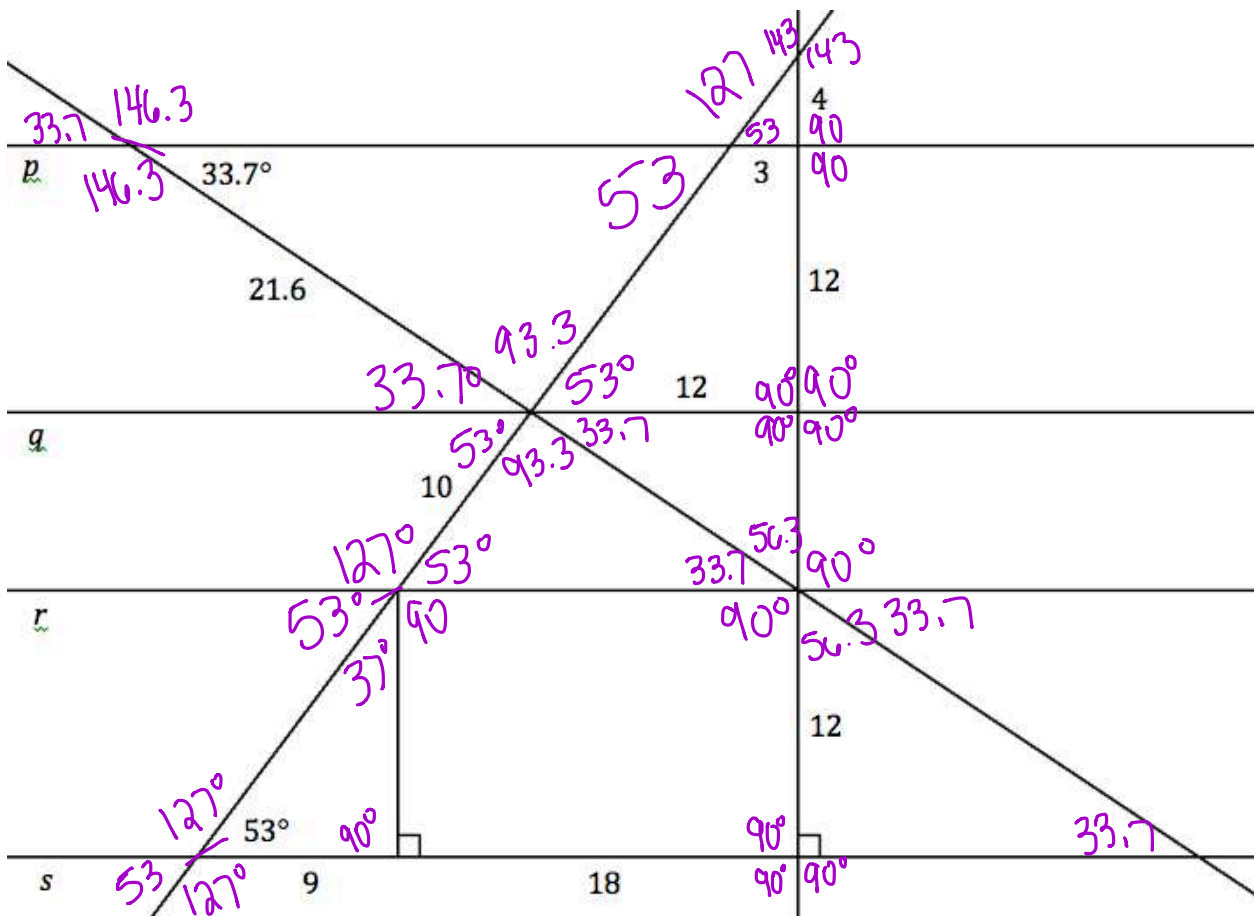
A Practice Understanding Task



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Find the measures of all missing sides and angles by using geometric reasoning, not rulers and protractors. If you think a measurement is impossible to find, identify what information you are missing.

Lines $p, q, r,$ and s are all parallel.



1. Identify at least three different quadrilaterals in the diagram. Find the sum of the interior angles for each quadrilateral. Make a conjecture about the sum of the interior angles of a quadrilateral.

Conjecture:

2. Identify at least three different pentagons in the diagram. (Hint: The pentagons do not need to be convex.) Find the sum of the interior angles for each pentagon. Make a conjecture about the sum of the interior angles of a pentagon.

Conjecture:

3. Do you see a pattern in the sum of the angles of a polygon as the number of sides increases? How can you describe this pattern symbolically?

$$n\text{-gon } n \quad 180 \times n - 360$$

4. How can you convince yourself that this pattern holds for all n -gons?

Teacher said so

READY, SET, GO!

Name

Period

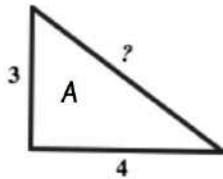
Date

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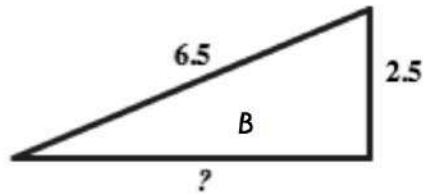
Topic: Pythagorean Theorem and ratios of similar triangles

Find the missing side in each right triangle. Triangles are not drawn to scale.

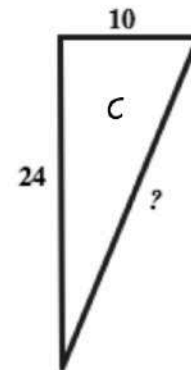
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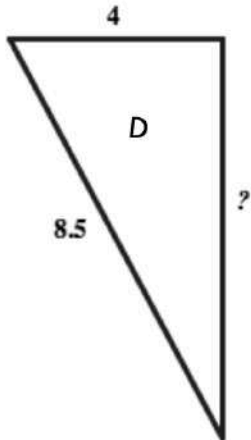
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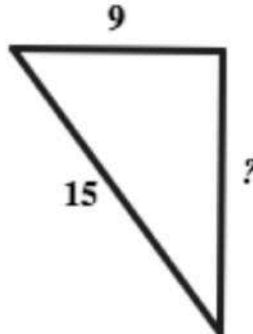
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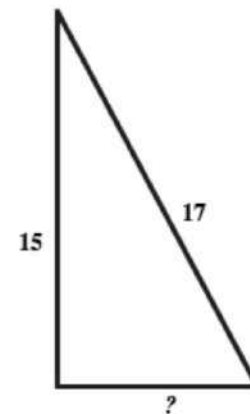
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5.



6.



7. Based on ratios between side lengths, which of the right triangles above are mathematically similar to each other? Provide the letters of the triangles and the ratios.

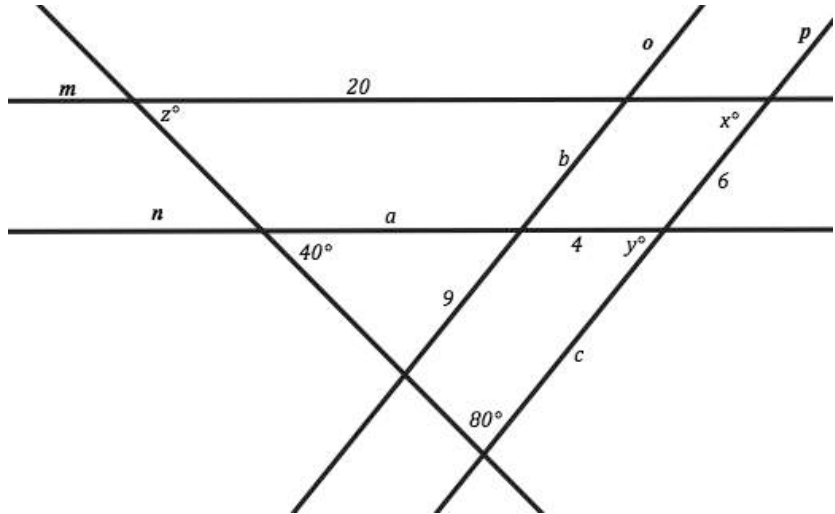
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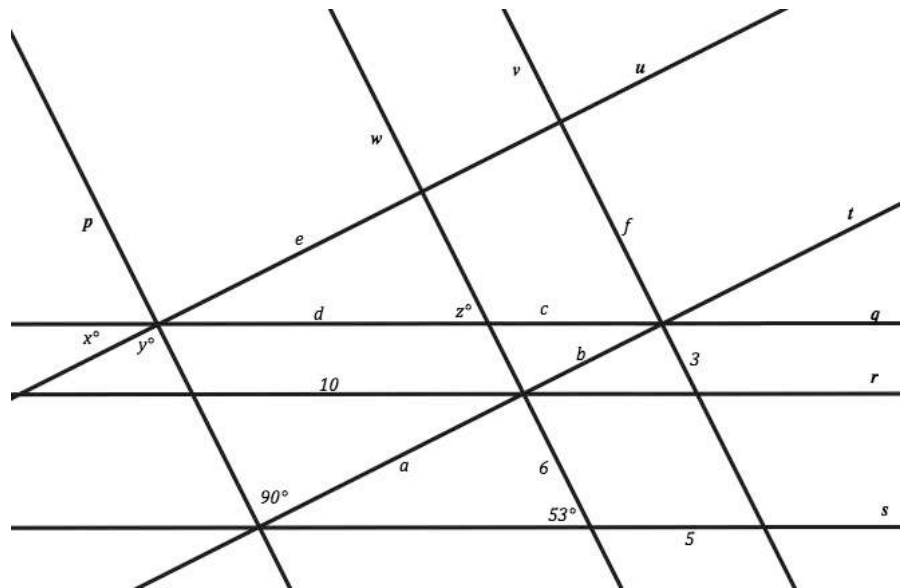
Topic: Using parallel lines, and angle relationships to find missing values.

In each of the diagrams use the given information provided to find the missing lengths and angle measurements.

8. Line $m \parallel n$ and $o \parallel p$, find the values of angles x, y and z . Also, find the lengths of a, b and c .



9. Line $q \parallel r \parallel s$ and $t \parallel u$ and $p \parallel w \parallel v$, find the values of angles x, y and z . Also, find the lengths of a, b, c, d, e, f .



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GO

Topic: Solve equations including those including proportions

Solve each equation below.

10.

$$3x - 5 = 2x + 7$$

11.

$$\frac{5}{7} = \frac{x}{21}$$

12.

$$\frac{3}{x} = \frac{18}{5x + 2}$$

13.

$$\frac{1}{2}x - 7 = \frac{3}{4}x - 8$$

14.

$$17 + 3(x - 5) = 2(x + 3)$$

15.

$$\frac{x + 5}{6} = \frac{3(x + 2)}{9}$$

16.

$$x + 2 + 3x - 8 = 90$$

17.

$$\frac{5}{12} = \frac{x}{8}$$

18.

$$\frac{4}{5} = \frac{x + 2}{15}$$

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