Triangle inequality worksheet kuta

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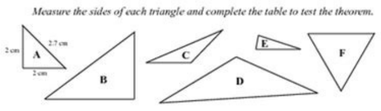
MathFLIX CHALLENGE

To be a triangle or not to be a triangle?

According to the **Triangle Inequality Theorem**, the sum of the lengths of any two sides of a triangle is greater than the length of the third side: **side 1 + side 2 > side 3**

Measure the sides of each triangle and complete the table to test the theorem.



Shape ID	Length of Side 1	Length of Side 2	Side 1 + Side 2	Measure of Side 3	Type of triangle (side)	Type of triangle (angle)
A	2 cm	2 cm	4 cm	2.7 cm	isosceles	90°
B						
C						
D						
E						
F						

Use the dimensions below to see if shapes G through L can be triangles.

Shape ID	Length of Side 1	Length of Side 2	Length of Side 3	Triangle? Yes/No
G	1cm	1cm	1cm	
H	1cm	1cm	2cm	
I	1cm	3cm	1cm	
J	4cm	1cm	1cm	
K	4cm	5cm	1cm	
L	4cm	3cm	2cm	

Sketch Area

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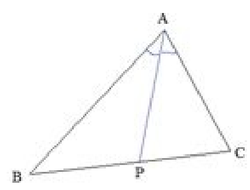
Angle Bisector Theorem

Definition: The angle bisector divides the opposite side into 2 parts with the same relative lengths (ratio) as the other two sides of the triangle.



$\overline{AP}$ is the angle bisector

Opposite side is divided into two parts: $\overline{BP}$ $\overline{CP}$

Ratio of other two sides of triangle: $\frac{\overline{AC}}{\overline{AB}}$

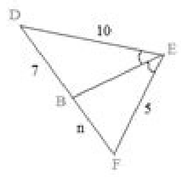
$$\frac{\overline{AC}}{\overline{AB}} = \frac{\overline{CP}}{\overline{BP}}$$

Also, simple algebra can show that ratios of "new triangle sides" are the same!

$$\frac{AC}{AB} = \frac{CP}{BP} \longrightarrow AC \cdot BP = AB \cdot CP \longrightarrow \frac{AC \cdot BP}{CP} \cdot AB \longrightarrow \frac{\overline{AC}}{\overline{CP}} = \frac{\overline{AB}}{\overline{BP}}$$

Example:

What is n?



Since $\angle DEB \cong \angle FEB$, $\overline{BE}$ is an angle bisector...

Therefore, we can use the angle bisector theorem to find n:

$$\frac{DE}{EF} = \frac{DB}{BF} \quad \text{or,} \quad \frac{DE}{DB} = \frac{EF}{BF}$$

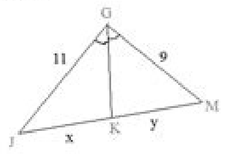
$$\frac{10}{5} = \frac{7}{n} \qquad \frac{10}{7} = \frac{5}{n}$$

$n = 3.5$ $n = 3.5$

Example: Find x and y:

$x + y = 14$

$\angle GKJ \cong \angle GKM$



Using the angle bisector theorem and substitution:

$$\frac{11}{x} = \frac{9}{(14 - x)}$$

$9x = 154 - 11x$

$20x = 154$

$x = 7.7$ then, $y = 6.3$

8th Grade Common Core Name_____ ID: 1

Pythagorean Theorem Practice 1.2 Date_____ Period____

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Find each missing length to the nearest tenth.

1)

2)

3)

4)

5)

6)

7)

8)

9)

10)

11)

12)

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Name_____

One of These Things is not Like the Others

The T.V. show Sesame Street had a game they played called "one of these things is not like the others." We're going to play a few rounds of this game to discover two important things about the relationships between different geometric figures.

Round 1 Use watchmen, rulers, and protractors to determine which figure (Figure A-D) is not like the others. Then answer the questions below.

1. Which figure is not like the others?
2. Are the other three figures really the same?
   a. What about the three figures is the same? (There are 3 things)
   b. What about the three figures is different?
3. The figure that is not the same as the other three is still **similar** to the other three.
   a. What does that tell figure share with the other three figures? (There are 3 things)
   b. Create a copy of one of the three figures that are identical then do something to it. What did I do to it to make it different from the other three.

Round 2 Use watchmen, rulers, and protractors to determine which figure (Figure E-H) is not like the others. Then answer the questions below.

1. Which figure is not like the others.
2. Are the other three figures really the same?

Pythagorean Theorem

The Distance Formula is a variant of the Pythagorean Theorem.

You may calculate the distance between two points using the the Distance Formula.

The Distance Formula: Given the two points $P1(x_1, y_1)$ and $P2(x_2, y_2)$, the distance between these points is given by the formula:

$$\text{distance} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Triangle inequality formula. Triangle inequality applications. Triangle inequality explained.

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