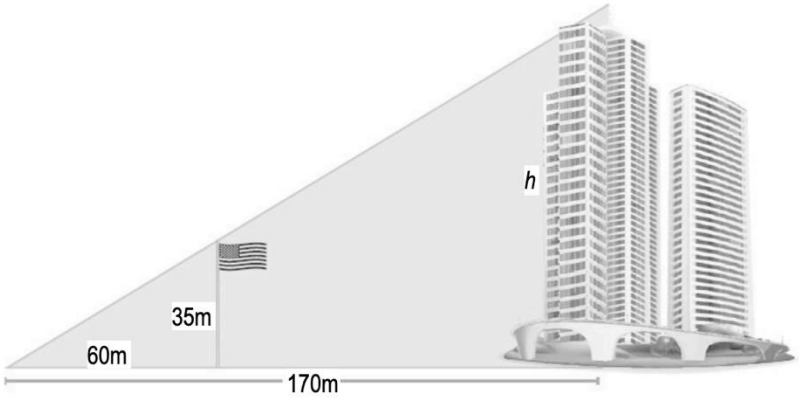
Name: _____ **Date: _____**

Period: _____ **Triangle Similarity Applications**

Can we use triangle similarity to solve some real-world problems? Let's see.

1. In the diagram below, a large flagpole stands outside of an office building. Marquis realizes that when he looks up from the ground, 60m away from the flagpole, that the top of the flagpole and the top of the building line up. If the flagpole is 35m tall, and Marquis is 170m from the building, how tall is the building?



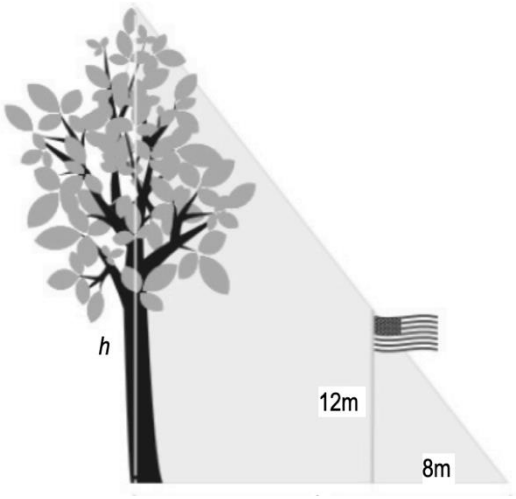
   a. Are the triangles in the diagram similar? Explain. If they are similar, state the triangle similarity theorem that justifies your response. Use colored pens or pencils to help identify the two triangles.

   b. Determine the height of the building using ratios between similar figures.

We can also use “shadows” to create triangles. These triangles can then be used to create ratios that allow us to solve for missing lengths and heights. Let’s see how this works.

2. At a certain time of day, a 12 meter flagpole casts an 8m shadow. Write an equation that would allow you to find the height, h, of the tree that uses the length of the tree’s shadow.

   a. Use colored pens or pencils to help identify the two triangles in the diagram below.



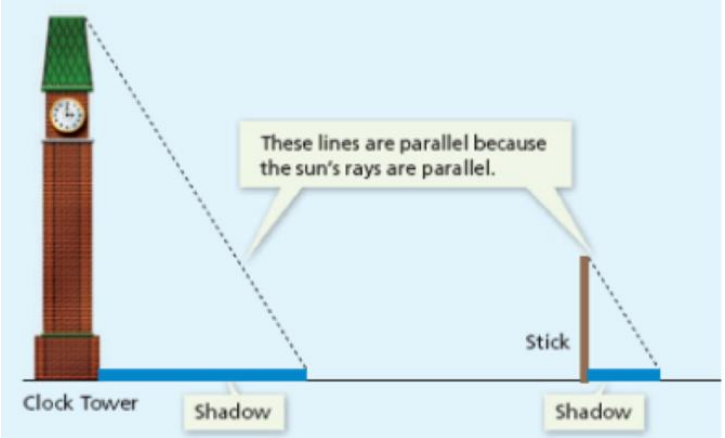
   b. The length of the tree’s shadow is 30 meters. Label the diagram to show the location and length of the tree’s shadow.

   c. Where is the sun in the diagram? Draw the sun in the appropriate location.

   d. Write and solve a ratio equation that will help you find the height of the tree.

3. Let's try another shadow problem. You are given the following measurements:
   - The length of the stick is 3 m
   - The length of the stick's shadow is 1.5 m
   - The length of the building's shadow is 8 m.

   a. Label the diagram with the appropriate measures.



   b. Are the triangles similar? If so, explain how you know.

   c. Write and solve an equation/ratio to find the height of the building.

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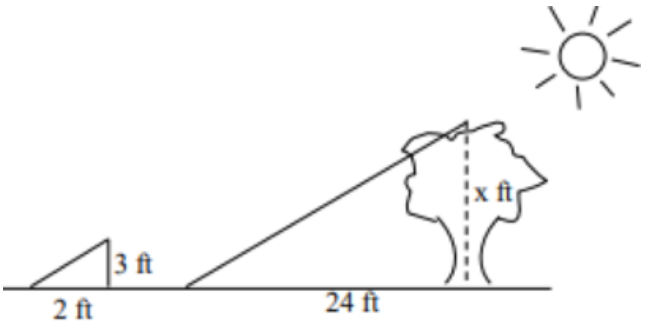
4. If a tree casts a 24-foot shadow at the same time a yardstick casts a 2-foot shadow, find the height of the tree.

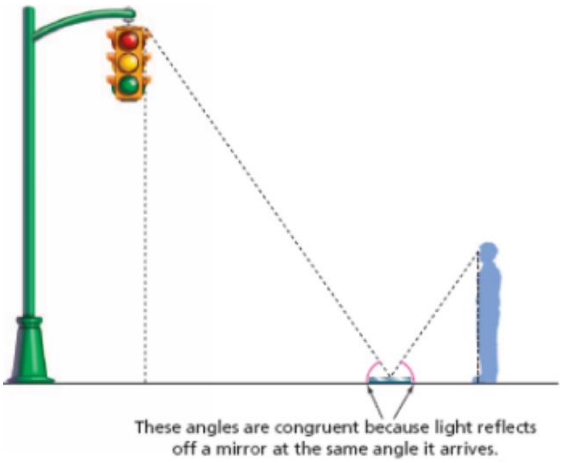


5. Situations involving mirrors can help us create similar triangles. You are given the following measurements:

- The height from the ground to the person's eyes is 150 cm.
- The distance from the middle of the mirror to the person's feet is 100 cm.
- The distance from the middle of the mirror to a point directly below the traffic light is 450 cm.

a. Label the diagram with the given measurements.

b. Are the triangles similar? If so, explain how you know.



c. Write and solve an equation/ratio to find the height to the top of the traffic light.

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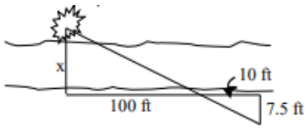
6. A giant bag of Flaming Hot Cheetos is spotted on the other side of the canyon. See the diagram below.



a. Use colored pens or pencils to outline the two triangles.

b. Are the triangles similar? If so, how do you know. Be very specific and label any congruent angles.

If you have a 50-foot long rope, will the rope be long enough for you to string across the canyon so that you can zip line to the Cheetos? Write and solve a ratio/equation to help you determine if you have enough rope.