Geometry H
Mrs. Diaz

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DATE: _____

UNIT 5
ASSIGNMENT #8

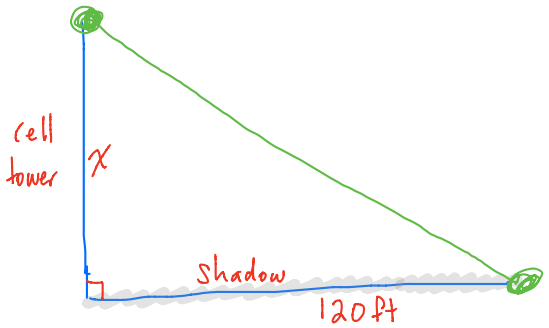
Using Proportions to Solve Word Problems.

Think About a Plan

Indirect Measurement A 2-ft vertical post casts a 16-in. shadow at the same time a nearby cell phone tower casts a 120-ft shadow. How tall is the cell phone tower?

Know

1. Draw a sketch of the situation described in the problem. Label the sketch with information from the problem and assign a variable to represent the unknown.



2. If you connect the top of each figure to the end of its shadow, what kind of polygons have you formed? How are these polygons related?

We have created 2 right triangles. These two triangles are similar, Because the sun hits the top of the post and the top of the cell phone tower at the same time creating the same angle.

3. Which parts of the polygons are corresponding?

Both of the shadows are corresponding, as well as the post to the cellphone tower.

Need

4. In your diagram, which corresponding parts have different units?

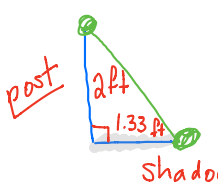
The shadow of the post is in different units to its shadow and the cell phone shadow.

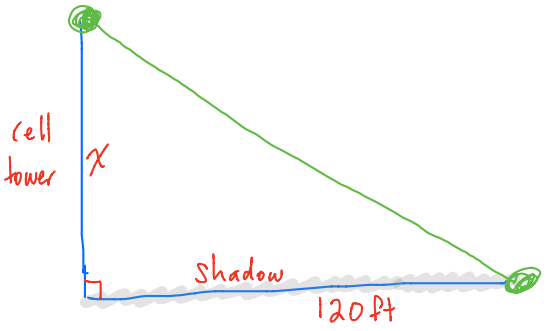
5. What must you do so that corresponding parts have the same units? Which unit does it make the most sense to change? Explain.

It makes most sense to change the length of the shadow from inches to feet.

6. Change the units and update your diagram.

16 inches = 1.33 ft





Plan

7. Write a proportion in words that compares the corresponding parts.

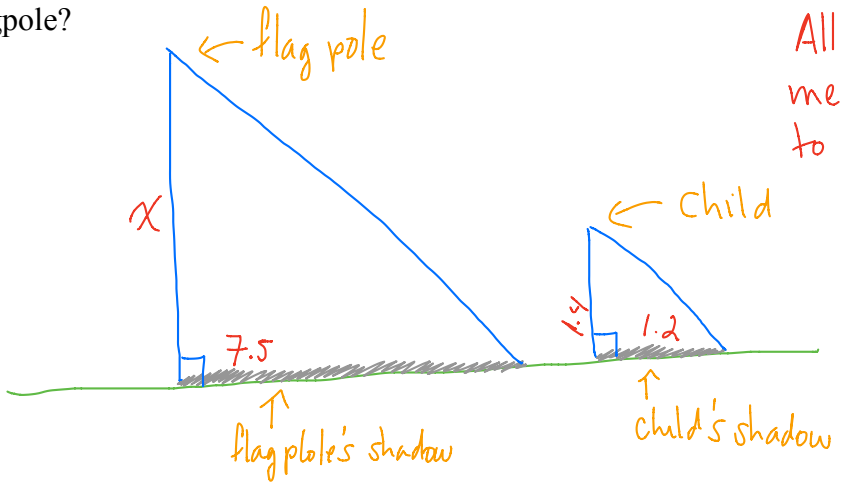
The height of the post and its shadow is proportional to the height of the cellphone tower and its shadow.

8. Use information from the diagram to write and solve a numerical proportion. What is the height of the cell phone tower?

$$\frac{2}{1.33} = \frac{x}{120} \Rightarrow \frac{2(120)}{1.33} = \frac{1.33x}{1.33} \Rightarrow x = 180.45$$

Your Turn

A 1.4-m tall child is standing next to a flagpole. The child's shadow is 1.2 m long. At the same time, the shadow of the flagpole is 7.5 m long. How tall is the flagpole?



All units are in meters (m) no need to change units

$$\frac{x}{7.5} = \frac{1.4}{1.2}$$

$$\frac{1.2x}{1.2} = \frac{(7.5)(1.4)}{1.2}$$

$$x = 8.75$$

the flagpole is 8.75 meters tall.