SIMILAR TRIANGLES PROJECT

Due Tuesday, November 29, 2016

GROUP MEMBER'S NAMES
<table>
<thead>
<tr>
<th>Name</th>
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<tr>
<th>REAL LIFE HEIGHT OF TALL OBJECT</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pictures drawn accurately, height found correctly for both methods.</td>
<td>Shows a proficient understanding, with a few minor mistakes.</td>
<td>Shows a basic understanding, but shows some misunderstanding in drawing the picture or calculating the height.</td>
<td>Shows little to no understanding.</td>
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<tr>
<th>APPLICATION QUESTIONS</th>
<th>4</th>
<th>3</th>
<th>2</th>
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<tbody>
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<td>Pictures drawn accurately, questions answered correctly with work shown.</td>
<td>Shows a proficient understanding, with a few minor mistakes.</td>
<td>Shows a basic understanding, but shows some misunderstanding in drawing the picture or answering the questions.</td>
<td>Shows little to no understanding.</td>
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PART I: HEIGHT OF A TALL OBJECT

METHOD A: SHADOWS
Use similar triangles constructed with the shadows of a TALL object and yourself to determine the height of a TALL object.

SETUP
A. Have one person stand in a similar area to the object. Measure the height of the person and the length of the person’s shadow to the nearest ¼ inch. Write them in the table below in decimal form.
B. Measure the length of the TALL object’s shadow to the nearest ¼ inch. Write down this measurement.

1. Record your measurements from outside in the chart.

<table>
<thead>
<tr>
<th>Height of Person</th>
<th>Length of Person’s Shadow</th>
<th>Length of TALL Object’s Shadow</th>
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</table>
2. Draw a sketch that shows the two similar triangles. Label the sketch with your measurements.

3. Use the measurements you collected to find the height of the object. Show all of your work!!

4. The height of the ____________________________ is approximately _________ _____________.
   (object) (amount) (units)
METHOD B: MIRRORS
Use similar triangles constructed by using a mirror to view the height of the TALL object.

SETUP
A. Place the mirror on the ground a distance from the TALL object. Make sure you can see to the top of the TALL object in the mirror!
B. Now position yourself with the mirror between you and the TALL object so when you look at the mirror you see the top of the pole on the point marked on the mirror.
C. Have your partner make the following three measurements. Make the measurements to the nearest \( \frac{1}{4} \) inch. Write them down in decimal form.

5. Record your measurements from outside in the chart.

| Eye Height of Person | Distance from Heel to Mirror | Distance from Base of TALL Object to Mirror |
6. Draw a sketch that shows the two similar triangles. Label the sketch with your measurements.

7. Use the measurements you collected to find the height of the object. Show all of your work!!

8. The height of the ____________________________ is approximately _______ _______.

   (object) (amount) (units)
Suppose you threw a Frisbee and it landed on your roof, caught in the rain gutter. You want to know how high off the ground it is to the rain gutter to determine if a 12-foot ladder will suffice. You walk ten feet away from the house to place your mirror on the ground and then walk another five feet until you see the gutter in the mirror.

9. Draw a picture that represents this scenario. Label it with measurements you know.

10. How high off the ground is the gutter if it is five feet six inches to your eye level? Show your work!!

11. Using the answer from the previous question, determine how far back from the house your Dad would have to walk to see the same spot in the mirror, given he is seven inches taller than you.

12. Will the 12-foot ladder suffice if the ladder will hit the roof 9 inches from the top of the ladder, and the base of the ladder is 3 feet away from the line of the gutter? Explain. Include a diagram with your solution.
13. The Eiffel tower casts a shadow that is 1.5 m. At a certain time of day, a stick that is 3 m casts a shadow that is .015 m. How tall is the Eiffel tower?

14. The Sears building is among the tallest buildings in the world. At a certain time of day, a 90 meter pole cast a shadow that measures 180 meters. The Sears building’s shadow is 886 meters. How tall is the Sears building?

15. The Statue of Liberty is 92 meters tall. At a certain time of day, a stick that is 90 centimeters tall casts a shadow that is 2200 centimeters long. How many meters long will the Statue’s shadow be?