Names:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Pythagorean Theorem with Boxes

1. Which box do you have?

2. Measure the length, width, and height. What do you get? Be sure to include units!

Length =

Width =

Height =



3. Measure the three diagonals, dlh, dlw, dwh. What do you get? Be sure to include units!

dlh =

dlw =

dwh =

4. Using the Pythagorean theorem, compute dlh, dlw, and dwh.

dlh:

dlw:

dwh:

5. Do your answers to 4 and 5 match? Why or why not?



6. Try to measure dlhw. What do you get?

7. Can you create a formula for dlhw in terms of dlh and w?

8. Can you create a formula for dlhw in terms of dlw and h?

9. Can you create a formula for dlhw in terms of dhw and l?

10. Can you create a formula for dlhw in terms of l, w, and h?

11. What numerical value do your formulas predict for dlhw for your box? How does it compare to your measurement in problem 6? What can explain the discrepancy?

12. In terms of l, h, and w, what do you get if you compute

$d\_{lh}^{2}+d\_{wh}^{2}-d\_{lw}^{2}$ ?

13. Describe how you could compute h from knowledge of dlh, dwh, and dwl.

14. If a box has l = 2 ft, h = 3 ft, and w = 4 ft, then dhw = 5 ft, but dlh and dlw are not integers. Can you find an example where dlh is the only lenght which is not an integer?

15. If a box has l = 44 cm, h = 117 cm, and w = 240 cm, then each of dhw, dlh, and dlw work out to be integers. What are their values?

16. Can you think of an example for which all 7 lengths (l, h, w, dlh, dlw, dhw, dlwh) are all integers?