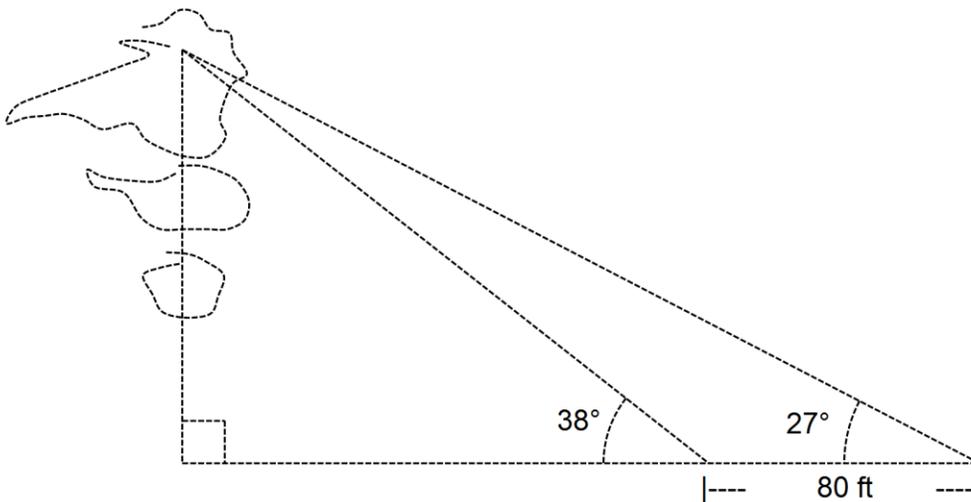
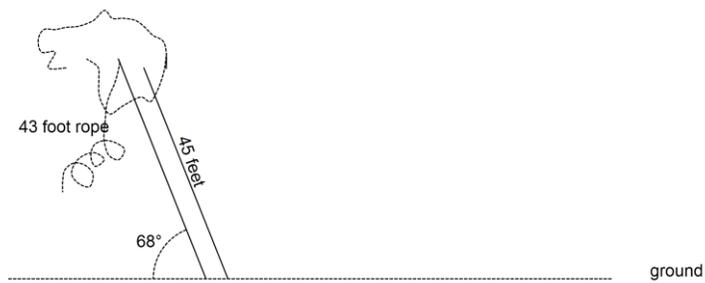


I was reasonable happy with the quiz because a couple of the problems (#4 & #6) allowed for different levels of insight and I got a wide range of answers. Questions #1 - #3 were things we had looked at a bunch. We had done optimizing problems like #4, but this was a new set up. Question #5 was not new, but I had not put much emphasis on “hill” problems. Question #6 and the bonus were completely new.

1. Find the height of a tree shown in the figure below:



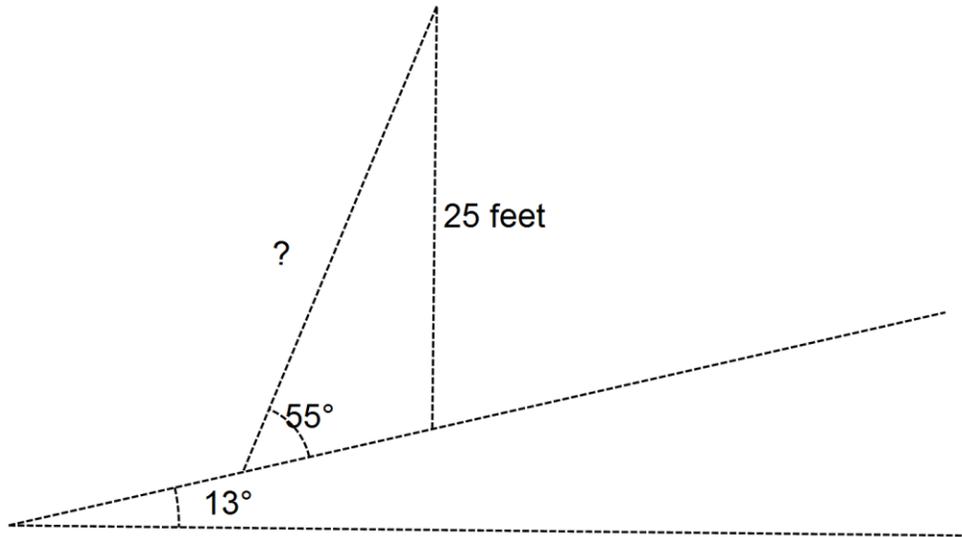
2. A 43 foot rope is tied at the top of a leaning tree and pulled taught to make a triangle. There are two triangles possible. What is the length of the third side on each possible triangle?



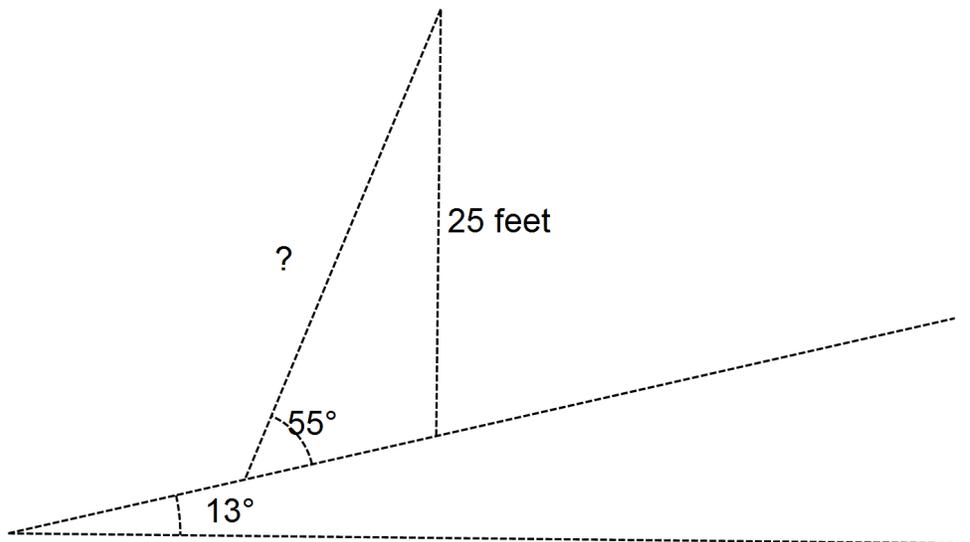
3. A boat leaves the dock and heads west for 70 minutes going 20 miles per hour. It then heads N30°E for 10 miles. How far is the boat from the dock?

4. You have seven sticks whose lengths are 1, 3, 5, 7, 9, 11 and 13 feet. You build a triangle with the longest side being 14 feet (o.k. to use more than one stick to make a side). What is the minimum possible area for the triangle? Show work please.

5. A 25 foot vertical telephone pole is on a hill sloped at 13° . What is the length of the wire attached to the pole?



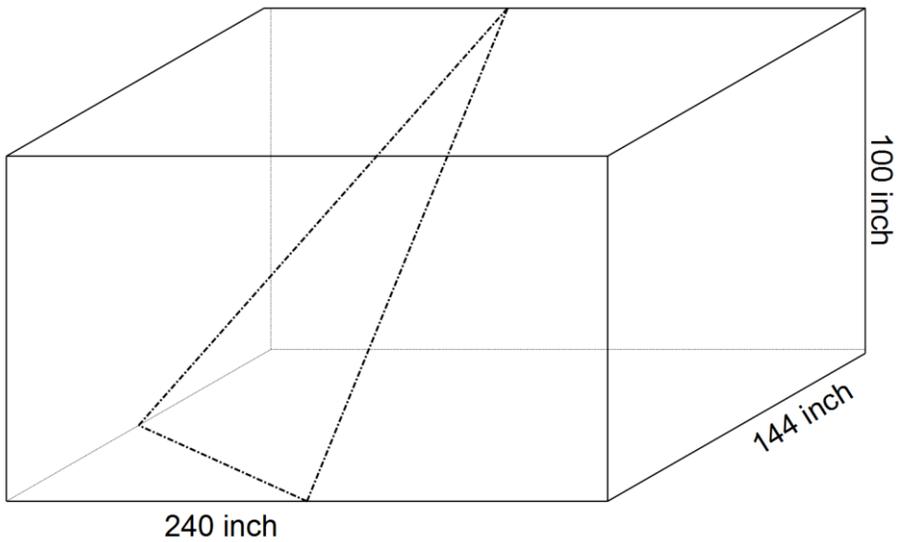
Extra Copy



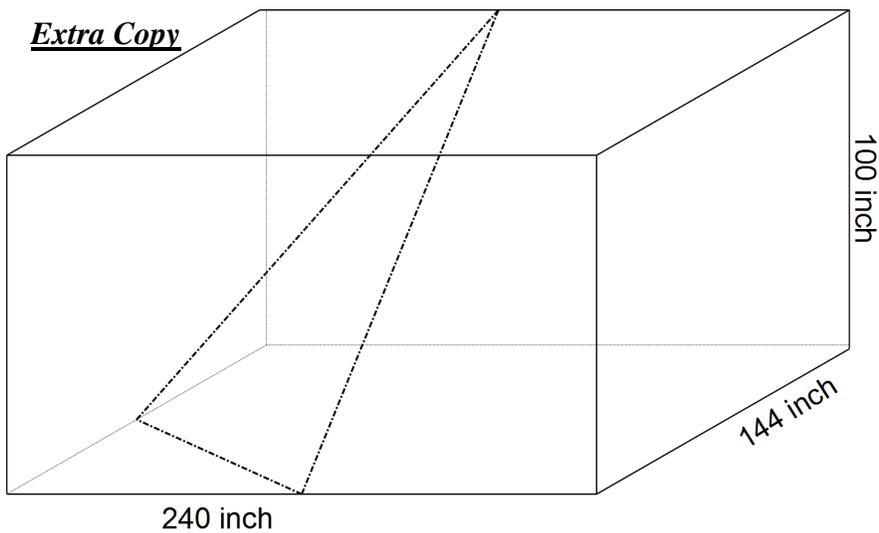
6) A triangle is formed inside of a large rectangular box. Each corner of the triangle bisects a segment in the diagram. In other words, the corners of the triangle are in the middle.

a) Find a couple of side lengths or angles for the triangle. Show some work.

b) (BONUS) Find the perimeter and area of the triangle. Show some work.

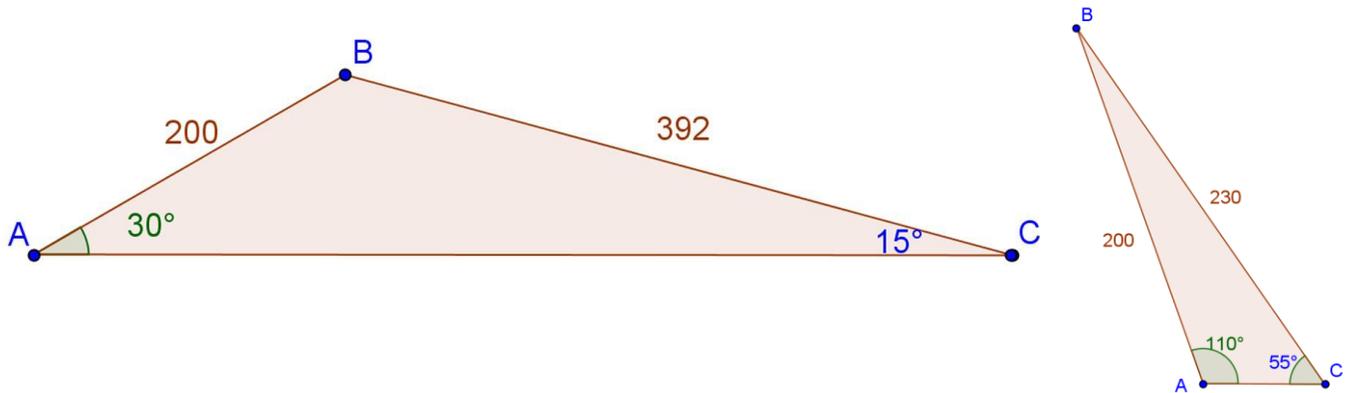


Extra Copy



BONUS #2: Side c is fixed at 200 units long. Angle A must be twice as large as angle C . I want side a to be 300 units long. My first attempt resulted in too large a value (392). My second attempt resulted in too small a value (230). Can you please help me with this conundrum?

•



- a) What is the right size for angle A – the one that makes side a have a length of 300? Keep in mind that angle A must be twice as large as C , and the length of side c must be 200.
- b) Now I would like an answer accurate to 4 decimal places. In other words, I am not interested in a guess and check approach. Show some work or explain.