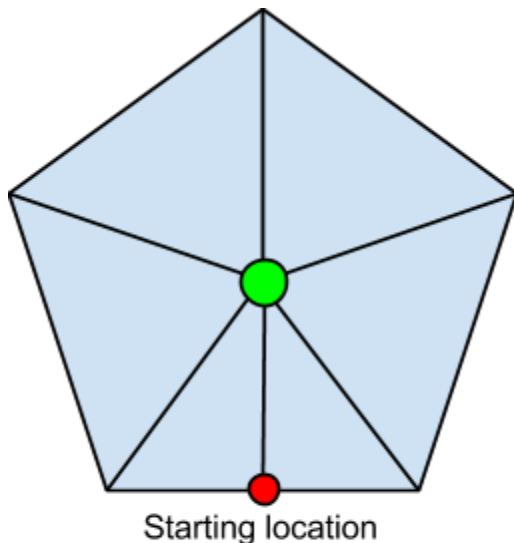


Problem #1

Jimothy found out that his parents completely made up his name when he was born. He was really mad, so he began to walk towards his house at 5 miles per hour. If he starts at the edge of the giant pentagonal park he lives in, and his house is in the middle, how far would he have to walk? Assume his walk around the perimeter takes 1 hour at his normal pace.

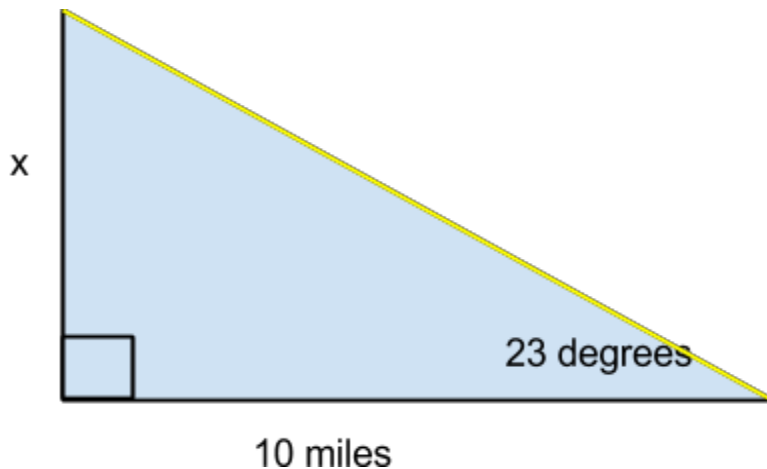
Here is a diagram of what we can tell from the picture.



If it takes him an hour at 5 miles per hour, the perimeter is 5 miles. Since there are 5 sides in a pentagon, each side is 1. From the edge to midpoint, it is $.5$, where Jimothy is located. We can form a right triangle with the $.5$ miles long side, with the radius and apothem. To find the angles of the triangle, we can divide 360 degrees by 5 mini angles to get 72. One half of that, 36, is the measure of one of the mini triangle's angles. Now that we know the opposite side and the angle, we can solve for the adjacent using tangent. The tangent of 36 degrees is equal to $.5$ divided by x , the distance to Jimothy's house. If we solve, we get x being equal to $.68819$ miles. **The answer is $.68819$ miles.**

Problem #2

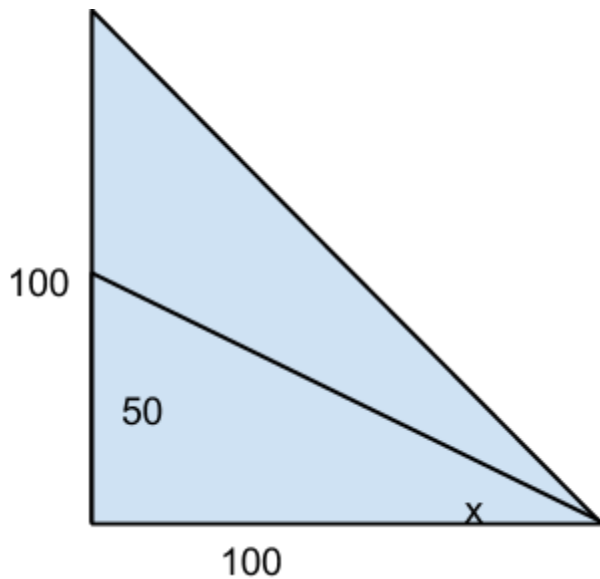
A man has been stranded on an evacuation raft for many days with a starving tiger. Somehow, he manages to make it stop fighting him. He sees a lighthouse ray shining at him, and it looks to be about ten miles away. If the angle of elevation from ground of raft to beam of light is 23 degrees, how tall is the tower? (I am still not sure how this helps the poor man)



This is an easy to tackle problem, if you aren't fending off a tiger and starving to near death. Since we need to compare the opposite and adjacent sides, tangent would be beneficial to solving this problem. The tangent of 23 degrees is equal to x divided by 10. In other words, $\tan(23) \cdot 10 = x$. Simplified we get x to be 4.2447 miles. I am not sure if the stranded man is hallucinating, but apparently there is a 4.2447 mile tall lighthouse.

Problem #3

Joe is surveying a tower (like everyone else it seems) it was 100 feet away and 100 feet tall, with an angle of elevation from the ground of 45 degrees. The demolitionist was also there, so the tower got blown to smithereens. Only half of the tower still stands. What is the angle of elevation to the top of the tower from the ground?



The half of the 100 foot tower still standing is 50 feet tall. The distance is still 100 feet, so we know the opposite and adjacent sides of the triangle. The tangent of x degrees equals 50 divided by 100. In other words, $\tan^{-1}(50/100) = x$. If we simplify, we get **about 27**, to the nearest degree. I sure hope the demolitionist was supposed to destroy that tower!