practice questions 9/20

queestion 1

x(n) = 2x(n/2) + n, x(1) = 1

1. x(n/2) = 2x(n/4) + (n/2)
    1. x(n) = 2(2x(n/4) + n/2) + n
    2. x(n) = 4x(n/4) + 2n
2. x(n/4) = 2x(n/8) + n/4
    1. x(n) = 4(2x(n/8) + n/4) + 2n
    2. x(n) = 8x(n/8) + 3n
3. x(n) = $2^{k*x(n/(2}$k)) + kn
4. 1 = n/2^k
    1. 2^k = n
    2. k = lg(n)
5. x(n) = n + n*lg(n)

brute force - check all possible solutions

generate all pathagrean triplets

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// a^2 + b^2 = c^2
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convex hull problem

A set of points (finite or infinite) in a plane is called convex if for any 2 points p and q in the set, the entire line segment with end points p and q belongs to the set.

The convex hull of a set S of points is the smallex convex set containing S.

so you have a cloud of points and you need to find the perimeter. you can solve this by choosing a line segment and checking if all other points are on one side of the segment. if they are, then it is a perimeter line. otherwise it is an inner line.

this is not just n! or n^2, because you need to create pairs of lines, and compare. creating the lines would be C(n, 2), or $\frac{n!}{2!\cdot(n-2)!} = \frac{n(n-1)}{2}$ and for verifying takes on average $\frac{n}{2}$, for a total complexity of $\theta(n^3)$. Gram's method uses first sorts it and then it is a linear complexity.