Sources: https://www.cs.umd.edu/class/spring2020/cmsc754/Lects/lect03-hulls-bounds.pdf

http://www.suffolkmaths.co.uk/pages/Maths%20Projects/Projects/Topology%20and%20Graph%20Theory/Chinese%20Postman%20Problem.pdf

2. This reduction essentially projects all points onto a parabola. The resulting set of points is already sorted in the projection process, and this sorted order is the same as the sorted order of the original points. We can then sort the original set to match the order of the projection, which results in the sorted convex hull. Since this process must first iterate through all points in the mapping step (the n portion of the complexity equation), then sort all points (log n), the time complexity is at best O(n log n) (unless points are presorted).

3. The max cut problem has been proven to be dual to the route inspection problem (or Chinese postman problem), so you can apply route inspection algorithms to the problem of finding the max cut. Here's an example of a Chinese postman algorithm:

> 1. List all odd vertices.
>
> 2. List all possible pairings of odd vertices.
>
> 3. For each pairing find the edges that connect the vertices with the minimum weight.
>
> 4. Find the pairings such that the sum of the weights is minimised.
>
> 5. On the original graph add the edges that have been found in Step 4.
>
> 6. The length of an optimal Chinese postman route is the sum of all the edges added to the total found in Step 4.
>
> 7. A route corresponding to this minimum weight can then be easily found.

4. This algorithm isn't polynomial because the time complexity rate of growth relates *directly* to the input size. Since we're talking about a brute force algorithm, every n of the set has to evaluated until a composite is found. There's no polynomial increase in complexity as seen with algorithms like selection sort because there isn't a constant exponent applied to n.