Exercise Set 8

Exercise 1:
Prove: If $P \neq NP$, then there is no polynomial-time approximation algorithm A for the
STEINER TREE PROBLEM for which $|A(I) - OPT| \leq B$ for any constant B.

(4 Points)

Exercise 2:
Describe an algorihm for the STEINER TREE PROBLEM which runs in $O(n^3)$ for instances (V, E, c, K) with $|V \setminus K| \leq s$ for some constant s.

(4 Points)

Exercise 3:
Consider the RECTILINEAR STEINER TREE PROBLEM: The terminal set is a finite set
$K \subset \mathbb{R}^2$, Steiner points can be created anywhere in the plane, and all line segments
have to be either vertical or horizontal. Show that there is an algorithm which finds a
shortest rectilinear Steiner tree in finite time.

(4 Points)

Please return the exercises until Tuesday, **June 16nd, at 2:15 pm**.