MATH 61-02: WORKSHEET 10 (§6.1-6.4)

(W1) Show that $\sqrt{1+\sqrt{2+\sqrt{3+\sqrt{5}}}}$ is an algebraic number.

(W2) Prove that if the interval $[0,1]$ is partitioned into nondegenerate intervals (i.e., points don't count as intervals), then the partition is countable. Explain why this implies the same result for partitions of $\mathbb{R}$.

Hint: first list all the intervals of length $> 1/2$...

(W3) Show that the Cantor set is uncountable. (See 6.4.8 in the book.) This one is easily googled, but try it on your own!