MATH 61-02: WORKSHEET 7 (§6.1-6.3)

(W1) Show that $\mathbb{Z}^3$ is countable.

(W2) Show that $\sqrt{1+\sqrt{2+\sqrt{3+\sqrt{5}}}}$ is an algebraic number.

(W3) Let Q be the set of real numbers which are solutions to quadratic equations $ax^2 + bx + c = 0$ with integer coefficients (so $a, b, c \in \mathbb{Z}$).

(a) Why must $\mathbb{Q} \subset Q$? Show that Q also contains irrational numbers.

(b) Prove that Q is countable.