

# Problem Set 12

April 20, 2026

**Problem 1.** Show that  $\sqrt{2} + \sqrt{7}$  is an algebraic integer.

**Problem 2.** Let  $\alpha$  be a positive irrational number. Prove that we can find a pair of positive integers  $(x, y)$  such that

$$|x - y\alpha| < \frac{1}{y}$$