

SET 5

- (1) Let a, b, c be real numbers such that $a^2 + b^2 + c^2 = 1$. Prove that

$$-1/2 \leq ab + bc + ca \leq 1.$$

- (2) Let S be any finite set of distinct positive integers which are not divisible by any prime greater than 3. Prove that the sum of the reciprocals of all elements of S is less than 3.
- (3) Show that the product of four consecutive integers cannot be a square.