

Fall 2020

Problem set 2

Friday, September 23th, 2020

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During the class we discussed mostly the solutions to the proposed problems given in the first set of problems. Most of our proofs were explained on whiteboard and you can find the details there. I have also uploaded a pdf including the solutions-it is on onedrive!

However, there were couple of problems I proposed in class. Here they are!

1. Let $x_1, x_2, x_3, \dots, x_k$ be real numbers such that the set

$$a = \{\cos(n\pi x_1) + \cos(n\pi x_2) + \dots + \cos(n\pi x_k) \mid n \geq 1\}$$

is finite. Prove that x_i are rational numbers!

2. Find the volume of a region (x, y, z) such that the following inequality holds:

$$(x^2 + y^2 + z^2 + 8)^2 \leq 36(x^2 + y^2).$$