MULTIVARIABLE CALCULUS

MATH S-21A

Seminar Week 1

100.1. In this seminar part, we review a few parts of the week. As you have participated in class, this assignment should not take a lot of time.

ASSESSMENT AND REVIEW

This Assessment is also due on Tuesday, 6/30/2020, together with the other 4 assignments.

Problem 100.1: a) What was the most interesting thing you have seen this week?
b) What was the most difficult thing you have seen this week?

Problem 100.2: Summarize your finding about the Polya problem discussed in the in the Tuesday lecture.

Problem 100.3: Make a list of all definitions and notations you have seen this week.

Problem 100.4: Make a list of all theorems and formulas you have seen this week.

Problem 100.5: QRD: You are given data points $\vec{v} = [1, 0, -5, 1, 2]$ and $\vec{w} = [2, -1, 0, 1, -2]$ in 5 dimensional space. You do not have to fear that. These are just data. The cosine of the angle between these two vectors is called the correlation. The length of the vectors is called the **standard deviation** and the square of the length is called the **variance**. Compute all this and especially marvel about the fact that the Cauchy-Schwarz inequality holds also in 5 dimensions.

OLIVER KNILL, KNILL@MATH.HARVARD.EDU, MATH S-21A, HARVARD SUMMER SCHOOL, 2020