Math 317 Q1 Winter 2017 Quiz 1

Jan. 20, 2017, 25 minutes

- The quiz has 3 problems. Total $10 + 1$ points.

QUESTION 1. (5 PTS) *Let* $S := \left\{ \sin\left(\frac{1}{n}\right) \mid n \in \mathbb{N} \right\}$. *Find all cluster points of* S. *Justify your claim.*

QUESTION 2. (5 PTS) *Calculate all first and second order partial derivatives of* $f(x, y) := e^{xy} \cos(y)$.

QUESTION 3. (1 BONUS PT) *Let $A := \left\{(x,y)\mid 0 \leqslant x \leqslant 1, y = \frac{1}{q} \text{ if } x \in \mathbb{Q}, x = \frac{p}{q} \right.$ in lowest terms, and $y = 0$ if $x \notin \mathbb{Q}.\Big\}$ Prove that A has zero content.*