

Math 3593H Honors Math II
Quiz 1, Thursday Feb. 2, 2017

Instructions:

20 minutes, closed book and notes, no electronic devices.

There is one problem with three parts, worth a total of 20 points.

1. (9 points) Consider the set

$$M = \left\{ \begin{pmatrix} x \\ y \\ z \end{pmatrix} \in \mathbb{R}^3 : x^5 + y^{50} = 3 - z^{500} \right\}.$$

- (i) Prove that M is a manifold.

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(ii) (2 points) What is the dimension of M as a manifold?

(iii) (9 points) Write down a basis for the tangent space $T_{\begin{pmatrix} 1 \\ 1 \end{pmatrix}} M$.