

Geometry 1, MTH G122.
Fall 2004. Professor Mikhail Shubin.

Textbook:

Foundations of Differentiable Manifolds and Lie groups, by Frank W. Warner. Springer-Verlag New York, Inc., 1983.

Office: 460 Lake Hall. **Phone:** (617)373-5676 **E-mail:** shubin@neu.edu

Homework assignment no. 10
(due November 23)

1. Find all 1-parameter subgroups and the exponential map for the group of all affine transformations of \mathbb{R} (i.e. transformations of the form $x \mapsto ax + b$ with $b \in \mathbb{R}$ and $a > 0$).
2. (a) Find all 1-parameter subgroups and the exponential map for the 2-dimensional torus $\mathbb{T}^2 = S^1 \times S^1 = \mathbb{R}^2/\mathbb{Z}^2$.
(b) Can such a subgroup be periodic (i.e. $\varphi : \mathbb{R} \rightarrow \mathbb{T}^2$ where $\varphi(t + T) = \varphi(t)$ for some $T > 0$ and all $t \in \mathbb{R}$)?
(c) Can a 1-parametric subgroup of \mathbb{T}^2 be dense in \mathbb{T}^2 ?