

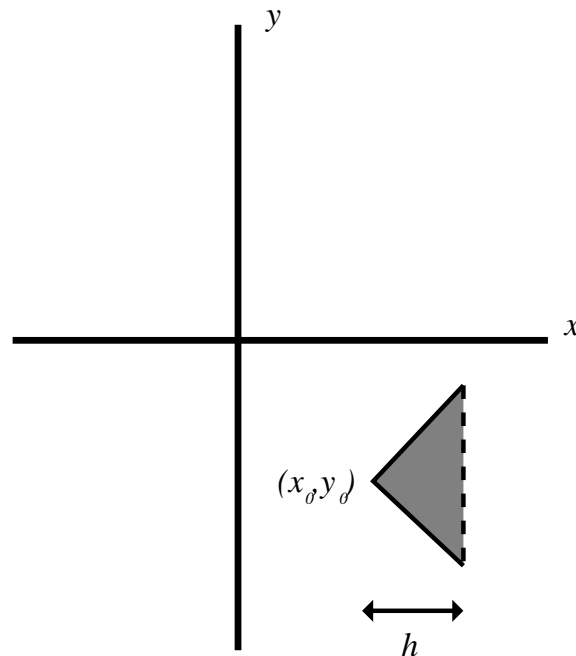
Math 490 Homework #1

due Friday, 8/31

- 1: Kinsey, Exercise 1.1 (p. 4)
- 2: Kinsey, Exercise 2.1 (p. 11)
- 3: Kinsey, Exercises 2.13 and 2.14 (p. 14)
- 4: Kinsey, Exercise 2.26 (p. 26)
- 5: (Exotic topologies on \mathbb{R} and \mathbb{R}^2) (a) Prove that the collection of all half-open intervals $[a, b)$, $-\infty < a < b < \infty$, forms a basis for a topology on \mathbb{R} .
(b) Prove that the collection of all sets of the form

$$\{(x, y) : x_0 \leq x < x_0 + h, |y - y_0| \leq x - x_0\}$$

where (x_0, y_0) is any point in \mathbb{R}^2 , and $h > 0$ is any positive real number, forms a basis for a topology T on \mathbb{R}^2 . A typical set of this type is exhibited in the following figure.



Prove that the subspace topology for T on the x -axis is the half-open topology from part (a), while the subspace topology for T on the y -axis is the discrete topology.