

Name (Print): \_\_\_\_\_

All of the following questions refer to a metric space  $M$  with distance function  $d$ , as defined in the textbook. In question 3, there is a second metric space  $N$  with distance function  $d_N$ .

1. The “triangle inequality” holds for the distances between any three points  $x, y, z \in M$ . What is this inequality?

2. The definition of the open ball of radius  $r$  a point  $x \in M$  looks like this:

$$B(x, r) = \{y \in M \mid \text{_____}\}$$

What goes in the blank to complete the definition?

3. A function  $f: (M, d) \rightarrow (N, d_N)$  is said to be continuous at  $x_0 \in M$  if for all  $\epsilon > 0$  there exists a  $\delta > 0$  such that ...

Complete the definition of continuous below. You need not precisely duplicate what is in the text, equivalent statements (of the sort you might have written in Math 330) are fine.

4. What does it mean for a set  $U \subset M$  to be open? The definition starts: for all  $x \in U$ , there exists  $\epsilon > 0$  such that ...

Complete the definition of open set below: