ECS 315: In-Class Exercise # 2

Date: 23 / 08 / 2018			
Name	ID (last 3 digits)		
Prapun	5	5	5

Instructions

1. Separate into groups of no more than three persons. **The group cannot be the same as any of your former groups.**
2. **Write down all the steps** that you have done to obtain your answers. You may not get full credit even when your answer is correct without showing how you get your answer.
3. **Do not panic.**

For each of the sets provided in the first column of the table below, indicate (by putting a Y(es) or an N(o) in the appropriate cells of the table) whether it is "finite", "infinite", "countably infinite", "uncountable". Explanation is not needed.

		Finite	Infinite	Countably Infinite	Uncountable
(a)	$\mathbb{R}$	**N**	**Y**	**N**	**Y**
(b)	$\{\pi, 2\pi\}$	**Y**	**N**	**N**	**N**
(c)	$[1,3]\cap[2,4]$	**N**	**Y**	**N**	**Y**
(d)	$[1,2]\cap[3,4]$	**Y**	**N**	**N**	**N**
(e)	The set of all real-valued x satisfying $\sin(x) = x$	**Y**	**N**	**N**	**N**

Each circle above indicates the key answer for the corresponding part.

(a) We have seen in class that the set of all real numbers is uncountable (Ex. 2.18).
Any uncountable set is infinite. Any infinite set is not finite.
Any uncountable set is not countable and therefore can not be countably infinite.

(b) The given set contains only two elements. Therefore, it is finite.
Any finite set can not be infinite, countably infinite, nor uncountable.

(c) The intersection gives [2,3] which is an interval of positive length (Ex. 2.18). Therefore, it is uncountable.
Because it is an uncountable set, the answers should be the same as part (a).

(d) The intersection gives empty set which is a finite set.
Because it is a finite set, the answers should be the same as part (b).

(e) There is only one solution: x = 0. Therefore, the set is a singleton which is finite.
Because it is a finite set, the answers should be the same as parts (b) and (d).
Note that we can plot sin(x) and x and see their intersection.
Even with lousy plots, one can tell that the number of solution is finite.