Zachary Talarick
I pledge my honor that I have abided by the Stevens Honor System.

Problem Set 4

① a. ~~[illegible]~~ If A and B are countably Infinite individually then $A \cup B$ is countably infinate since $A \cup B$ combines all the numbers in both sets which are countable.

b. If every number in a set is countable then a subset of that set has to be countable and if the subset is infinite it will be countably infinite.

c. If A and B are countable infinite would be infinite for ~~[illegible]~~ pairs of numbers in A and B (x, y) where x and y are both countable then $A \times B$ has to be countable infinite

d. If you mape Q to $Z \times (N - \{0\})$ ~~then~~ it is injective and since $Z \times N$ is countably infinite so is Q since its injective.

② a. ~~[illegible]~~ $\{(1,1), (1,2), (2,2), (3,3), (4,4) (1,4), (4,1), (4,2)\}$

b. ~~[illegible]~~ $\{(1,2), (2,1), (1,4), (4,1), (3,3), (2,4), (4,2)\}$

c. $\{(1,1), (1,2), (2,2), (3,3), (4,4), (1,4), (4,1), (2,4), (4,2)\}$