# MATH 6: ASSIGNMENT 25, REVIEW 2

May 9, 2021

1.  You know the truth tables for AND, OR, and NOT. They are very common gates. There are more fancy fates NOR, NAND, XOR. Please review the handouts from Homework 4, and 5.
    a.  Write the truth table for **NOT(X AND Y)**
    b.  Write the truth table for **(NOT(X)) OR (NOT(Y))**

2.  Using Venn diagrams, explain why $\overline{A \cap B} = \bar{A} \cup \bar{B}$. Assume for simplicity that there is nothing beyond sets A and B . See JamBoard notes.

3.  Let us take the usual deck of cards. As you know, there are 4 suits, hearts, diamonds, spades and clubs, 13 cards in each suit. (*This problem is from one of ex-homework*)
    Denote:
    H=set of all hearts cards
    Q=set of all queens
    R=set of all red cards
    Describe by formulas (such as $H \cap/\cup Q$) the following sets:
    all red queens
    all black cards
    all cards that are either hearts or a queen
    all cards other than red queens
    How many cards are there in each set?

4.  Draw the following sets on the number line:
    a.  Set of all numbers x satisfying $x \le 2$ and $x \ge -5$
    b.  Set of all numbers x satisfying $x \le 2$ or $x \ge -5$

5.  Solve the following inequalities:
    a.  $(x - 2)(x + 5) \le 0$
    b.  $(x - 2)(x + 5) \le 0$

6.  Remember radicals: $\quad \sqrt{ab} = \sqrt{a}\sqrt{b} \qquad \textcolor{red}{\sqrt{a + b} \ne \sqrt{a} + \sqrt{b}}$
    Calculate:
    a.  $\sqrt{17} \cdot \sqrt{11} \cdot \sqrt{17} \cdot \sqrt{11} \cdot \sqrt{11} =$
    b.  $(\sqrt{13} - \sqrt{11}) \cdot (\sqrt{13} + \sqrt{11}) =$
    c.  $(\sqrt{12} - \sqrt{3})^2 =$