判断

A,B,C为任意三个集合，若A包含于B,A包含于C，则A包含于B∩C

任意集合A，B，C，$2^A \bigoplus 2^B = 2^A \bigoplus 2^C$，则B=C

$\forall x P(x) \bigwedge \forall x Q(x) \iff \forall x (P(x) \bigwedge Q(x))$

{$ \bigvee $,⋀}是functional complete的。

$(A \bigcup B) \times (C \bigcup D) = (A \times C) \bigcup (B \times D)$

$(Z \times Q) \bigcap (R \times R)$ is uncountable

所有二分图都没有偶数长度的环。

任何没有cut-edge的简单图节点度数都是偶数。

简单平面图v-e+r=2.

存在一个full 3-ary tree，有22个节点。

大题

1.假设：$p \to (t \bigvee q), \neg q \to (s \bigvee \neg p), p, \neg q$

结论：$\neg (t \to \neg s)$

2.证明或者证伪

$(X \times Y) - (A \times B) = [X \times (Y - B)] \cup [(X - A) \times Y]$

3.infinite set:

A is the set of functions:$N \mapsto N$.~ is a binary relation on set A.

f ~ g= $\{n \in N | f(n) \neq g(n)\}$ is finite

Note that ~ is an equivalence relation. Show that A/~ is uncountable.

4.Determine if R (binary relation on set X) is reflexive,symmetric or transitive.If R is equivalent, verify its set of classes.

(a)X = Z, xRy if x+y is even.

(b)X = Z, xRy if xy is even.

5.Draw the Hasse diagram of partial orderings below. Find the maximal,mimimal,greatest and least element,if any.

(a) {2,3,6,12,18,24}, mRn if m divides n.

(b) {{2},{2,3},{2,4},{1,3,4},{2,3,4}}, mRn if $m \subseteq n$

6.(a)k >= 1,G's all vertices' degree is at least k.Prove:there must be a path of length k in G.

(b)G is a minimal non-planar graph(all its subgraphs are planar),Prove:G is connected.

7.Draw all the non-Isomorphic tree of 6 edges.

8.(a) tile a 3×n grid with 3×1 blocks.a_n denotes the number of different ways to tile.

Find the recurrence relation of a_n(with the valid range of n).

List the necessary initial conditions

List the first 6 values.

(b) Find the generating function of a_n,how to use it to solve a_n?(You don't have to solve the result,just explain the method)