MATH360. ADVANCED CALCULUS

A. A. KIRILLOV

Homeworks

1. Due Sept 17

1. Simplify the expression:
$$(A\backslash(A\cap B))\cup(B\backslash(B\backslash A)).$$
(2pts)

2. Show that the following sets are countable:

a) The set $\mathbb{Z}$ of all integers. (3pts)

b) The set $\mathbb{Z}[x]$ of all polynomials in x with integer coefficients. (6pts)

3. How many different sets one can construct from 10 given subsets of a set X using the operations $\cap$, $\cup$ and $^-$ ($\bar{A} := X\backslash A$)?

(E.g. from one set A one can construct 4 sets: A itself, $\bar{A}, \emptyset = A\cap\bar{A}$ and $X = A\cup\bar{A}$). (5pts)

4. Prove by induction:

a) $1^3 + 2^3 + \cdots + n^3 = (1+2+\cdots+n)^2$. (2pts)

b)The last digit of N^5 is the same as the last digit of N. (2pts)

5. Which relations are transitive:

a) being relative , b) being aquaintance, c) being ancestor? (2pts)

E-mail address: kirillov@math.upenn.edu

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