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Email to DrZlinear@gmail.com right after class

Subject:p0

with an attachment p0FirstLast.pdf

Part I: List all the "attendance questions" during the lecture, followed by your answers.

Who was Kurt Godel? Why was he important?

Part II:

One of the mathematician in 20th century

1. (a) Express the number one hundred eighty two (in our usual, base ten, notation) in terms of powers of 5.

How old was Gauss when he came up with his formula $\frac{n \cdot (n+1)}{2}$

$$10. \quad 5^0 = 1 \quad 5^1 = 5 \quad 5^2 = 25 \quad 5^3 = 125 \quad 5^4 = 625$$

$$182 = 1 \cdot 125 + 57$$

$$57 = 2 \cdot 25 + 7$$

$$7 = 5 + 2$$

$$57 = 2 \cdot 25 + 1 \cdot 5 + 2$$

$$182 = 1 \cdot 125 + 2 \cdot 25 + 1 \cdot 5 + 2 \cdot 1$$

$$= 1 \cdot 5^3 + 2 \cdot 5^2 + 1 \cdot 5^1 + 2 \cdot 5^0$$

(b) Use the the above to express one hundred eighty two (expressed in our usual, base ten, notation) in base five.

182 in base ten is written 1212 in base five.

2. What is the decimal name of the integer that is called "One million and one" in base 2?

One million and one in base 2 equal 65 in base 10.



Homework for Lecture 8

- (a) 100 in base ten is written 100 in base 2
- (b) 100 in base ten is written 10201 in base 3
- (c) 100 in base ten is written 1210 in base 4
- (d) 100 in base ten is written 400 in base 5
- (e) 100 in base ten is written 244 in base 6
- (f) 100 in base ten is written 202 in base 7
- (g) 100 in base ten is written 144 in base 8
- (h) 100 in base ten is written 121 in base 9
- (i) 100 in base ten is written 91 in base 11
- (j) 100 in base eleven is written A1 in base 12

4. 101.97

$$101 = 100 + 1 = 1 \cdot 10^2 + 0 \cdot 10^1 + 1 \cdot 10^0 = (1, 0, 1)$$

$$97 = 100 - 3 = 1 \cdot 10^2 + 0 \cdot 10^1 - 3 \cdot 10^0 = (1, 0, -3)$$

$$\begin{array}{r} 1 \quad 0 \quad 1 \\ 1 \quad 0 \quad -3 \\ \hline \end{array}$$

$$\begin{array}{r} -3 \quad 0 \quad -3 \\ 0 \quad 0 \quad 0 \\ 1 \quad 0 \quad 1 \\ \hline \end{array}$$

$$10 \quad -3 \quad 0 \quad -3 = 10000 - 203 = 9797$$

3. $26_{10} \times 80_{10}$

26_{10} is written 222 in base 3

80_{10} is written 2222 in base 3

$$\begin{array}{r} 22222 \\ 222 \\ \hline \end{array}$$

$$\begin{array}{r} 4444 \\ 4444 \\ 4444 \\ \hline \end{array}$$

$$\begin{array}{r} 4444 \\ 4444 \\ 4444 \\ \hline \end{array}$$

$$573324 = 50000 - 1002 + 3304 = 52302$$



4. 1(1) 2(2) 3(10) 4(11) 5(12) 6(20) 7(21) 8(22) 9(100) 10(101)

11(110) 12(111) 13(111) 14(112) 15(120) 16(121) 17(122) 18(200) 19(201) 20(202)

21(1010) 22(1011) 23(1012) 24(1020) 25(1021) 26(1022)

