

Practice 1.1 (September 20)¹

You have to fill this poll <https://goo.gl/forms/taeaUUBDWUVVTVIi1> before Monday 19, 10 pm. Problems 6 and 7 should be done after the theory class next Monday.

- In a given number system, digits from 1 to 9 are represented by symbols $\alpha, \beta, \gamma, \delta, \epsilon, \zeta, \eta, \iota, \kappa$. The symbols for powers of 10 are Γ (10), Δ (100), Λ (1000) y Π (10000). Write the number 43867 in an additive system and in an additive-multiplicative system.
- Find all 5-digit palindromic numbers in base 3 that are even numbers. (A number is palindromic if when read left to right is the same as when read right to left)
- Express in base 10 the biggest number that has 8 digits in base 2.
- Count by twos in base 5, from $31_{(5)}$ to $112_{(5)}$. (Nov 2013)
- Write $354_{(7)}$ in base 10.
 - Write 92 in base 3.
- Compute:
 - $100110_{(2)} + 11101_{(2)}$.
 - $354024_{(6)} + 450354_{(6)}$.
 - $A7F_{(16)} + BC2_{(16)}$.
 (In base 16, we use letters A, B, C, D, E, F to represent numbers 10, ..., 15).
- Fill in the boxes in the following base 8 addition.

$$\begin{array}{rcccccc}
 & & 5 & \square & 2 & 6 & \square & (8) \\
 + & \square & 2 & \square & 3 & 4 & & (8) \\
 \hline
 1 & 3 & 0 & 4 & \square & 1 & & (8)
 \end{array}$$

- In which base b the number $21_{(7)}$ is written as $14_{(b)}$?
- Two cyclists are on two villages, A and B , at distance 112 km. They start moving, to meet in a point in between A and B . They start cycling at noon, the cyclist at A moves at a constant speed of 18 km/h, and the cyclist at B moves at a constant speed of 22 km/h. When do they meet? (You have to solve this problem without algebraic methods, and give the answer in hours, minutes and seconds). (Nov 2013)
- Choose a 2-digit number and do this: if the number is odd, add one; if the number is even, divide by two. Now, iterate this process till you get 1. For instance if we start with 35 the sequence is

$$35 \rightarrow 36 \rightarrow 18 \rightarrow 9 \rightarrow 10 \rightarrow 5 \rightarrow 6 \rightarrow 3 \rightarrow 4 \rightarrow 2 \rightarrow 1$$

What 2-digit number gives the longest sequence?

¹All problems should be made without using a calculator. In the future, problems meant to be solved with the help of a calculator will be marked with the symbol ©.