

Number Theory Homework #6

Prof. Zeev Rudnick

To be handed in on Monday, December 19, 2016.

- 1) For p coprime to 10, we showed that the decimal expansion of $1/p$ is purely periodic, e.g. $1/11=0.090909\dots$. Let T be the minimal period of this expansion, e.g. for $p=11$ we have $T=2$. Show that the minimal period of the decimal expansion of $1/p$ is bigger than $\log_{10} p$.

- 2) Use Euler's criterion to determine which of the following congruences is solvable: $x^2 = 2 \pmod{41}$, $x^2 = 2 \pmod{43}$.

- 3) Show that the congruence $x^3 = a \pmod{173}$ has solutions for all a .
(A computer printout is not acceptable here!)

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Course homepage: http://www.math.tau.ac.il/~rudnick/courses/int_numth.html