

COMPUTER SCIENCE 20, SPRING 2012  
DISCRETE MATHEMATICS FOR COMPUTER SCIENCE

Class #31 (Arithmetic)

**Homework, due in hard copy Wednesday 4/25/2012 at 10:10am**

**Please write your TF's name on your homework, and list the names of any students with whom you collaborated.** At one time, the Guinness Book of World Records reported that the “greatest human calculator” was a guy who could compute 13th roots of 100-digit numbers that were powers of 13. What a curious choice of tasks . . .<sup>1</sup>

1. Prove that

$$d^{13} \equiv d \pmod{10}$$

for  $0 \leq d < 10$

2. Now prove that

$$n^{13} \equiv n \pmod{10}$$

for all  $n$ .

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<sup>1</sup>Credit: Albert R. Meyer, MIT 6.042