

Quantitative Reasoning 28: The Magic of Numbers

Homework 23

Assigned on April 15
Due at 5:00 p.m. April 18

Please submit problem sets to the boxes outside the Math Department's main office, on the third floor of the Science Center (Room 325).

Reading:

Gross-Harris, Chapters 13 and 20

Problems:

Please explain your reasoning and show your work.

1. The method we have used for computing roots $(\text{mod } n)$ can be applied to only part (c) of the following three problems. Explain why it fails for the first two problems, and solve the third.
 - (a) The 4th root of 4 $(\text{mod } 77)$;
 - (b) The 7th root of 7 $(\text{mod } 77)$;
 - (c) The 13th root of 13 $(\text{mod } 77)$.
2.
 - (a) Compute $3^{917} \pmod{140}$.
 - (b) Compute $4^{1125} \pmod{105}$.
3. Find a number x such that $x \equiv 3 \pmod{11}$ and $x \equiv 5 \pmod{15}$.