

Quantitative Reasoning 28: The Magic of Numbers

Homework 24

Assigned on Monday December 3rd
Due at 12 noon **Wednesday** December 5th

Please submit problem sets at the end of the relevant lecture, or leave in the box labeled QR28 outside the Math Department's main office, on the third floor of the Science Center (Room 325).

Reading:

Gross-Harris, Chapter 20

Problems:

Please explain your reasoning and show your work.

- Compute $3^{917} \pmod{140}$.
 - Compute $4^{1125} \pmod{105}$.
- The method we have used for computing roots \pmod{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.
 - The 4th root of 4 $\pmod{77}$;
 - The 7th root of 7 $\pmod{77}$;
 - The 13th root of 13 $\pmod{77}$.
- Compute the 11th root of 2 $\pmod{105}$.
 - Compute the 5th root of 4 $\pmod{43}$.