

Quantitative Reasoning 28: The Magic of Numbers

Homework 24

Assigned on Friday November 21st
Due at 12 noon **Monday** November 24th

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 13

Problems:

Please explain your reasoning and show your work.

1. Compute the following:
 - (a) $\phi(29)$. (Here $\phi(n)$ is Euler's phi function, as discussed in lecture.)
 - (b) $\phi(116)$.
 - (c) $\phi(6615)$.
2. $3^{28} \equiv 1 \pmod{29}$ by Fermat's Little Theorem (since 29 is prime).
Compute $3^{56} \pmod{116}$ using the Chinese Remainder Theorem (or by repeated squaring if you can't figure out how to use the CRT).