

# Quantitative Reasoning 28: The Magic of Numbers

## Homework 15

Assigned on March 16  
**Due at 5:00 p.m. March 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, Chapter 12

### Problems:

Please explain your reasoning and show your work.

- Let  $m = 2^5 \cdot 3^7 \cdot 5^2 \cdot 13 \cdot 41$ , and let  $n = 2^3 \cdot 3 \cdot 5^5 \cdot 11 \cdot 13$ .
  - What is the least common multiple of  $m$  and  $n$ ? (Please leave your answer in factored form.)
  - How many positive whole numbers divide both  $m$  and  $n$ ?
  - How many positive whole numbers divide  $m$  but not  $n$ ?
- Is  $\binom{22}{12}$  divisible by 23?
  - Is  $\binom{22}{12}$  divisible by 19?
  - Is  $\binom{22}{12}$  divisible by 15?
  - Find the greatest common divisor of  $\binom{22}{12}$  and 35.
- For which  $k$  between 1 and 7, inclusive, is  $\binom{8}{k}$  divisible by 8?