Quantitative Reasoning 28:
The Magic of Numbers

Homework 15

Assigned on Monday October 29th
Due at 12 noon Wednesday October 31st

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 12

Problems:

Please explain your reasoning and show your work.

1. Note that in this question you do not need to find the full prime factorization of the number!
   (a) What is the largest prime number that divides $\binom{26}{7}$?
   (b) What is the largest prime number that divides $\binom{26}{7}$ twice (i.e., whose square divides it)?
2. Find the prime factorization of
$$(3^{13} \times 5^{14} \times 11) - (3^{11} \times 5^{12} \times 11^3).$$
3. Let a be such that $\binom{21}{10} = 2^a \times 3 \times 7 \times 13 \times 17 \times 19$. Find a.