

# Quantitative Reasoning 28: The Magic of Numbers

## Homework 26

Assigned on April 22  
**Due at 5:00 p.m. April 25**

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 22

### Problems:

Please explain your reasoning and show your work.

1. Alice wishes to send a secret message to Bob using the public-key cryptographic protocol discussed in today's lecture (and in Chapter 22 of the book). Upon request, Bob sends her  $n = 143$  and  $k = 17$ . If Alice wants to transmit the encrypted version of the message  $m = 24$ , what should she send Bob?
2. Later, Ann wants to communicate with Bob. Bob chooses  $p = 11$ ,  $q = 17$ ,  $k = 23$ . After sending Ann  $n = 187$  and  $k = 23$ , he receives from her the number 177. What was Ann's message?