

## Math 262

### Section 2.4

Day 10

- Suppose that 45% of the phone calls you receive are scam calls. Assume that the probability of a scam call is independent from one call to the next.
  - Let  $X = 1$  if the next call you receive is a scam call, and let  $X = 0$  otherwise. What type of random variable is  $X$ ? What are its mean and standard deviation?
  - Let  $Y$  be the number of scam calls in the next 40 phone calls. What type of random variable is  $Y$ ? Sketch the pmf of  $Y$ .
  - What are the mean and standard deviation of  $Y$ ?
  - Suppose that you lose 30 seconds of your time every time a scammer calls your phone. What is the expected value and standard deviation of the amount of time you will lose over the next 40 phone calls?
- A coin that lands on heads with probability  $p$  is flipped ten times. Given that a total of 6 heads results, what is the conditional probability that the first three flips are *heads, tails, heads* (in that order)?

3. Among persons donating blood to a clinic, 85% have Rh<sup>+</sup> blood. Six people donate blood at the clinic on a particular day.

(a) Find the probability that at most three of the six have Rh<sup>+</sup> blood.

(b) Find the probability that at most one of the six does not have Rh<sup>+</sup> blood.

(c) What is the probability that the number of Rh<sup>+</sup> donors lies within two standard deviations of the mean number?

(d) The clinic needs six Rh<sup>+</sup> donors on a certain day. How many people must donate blood to have the probability of obtaining blood from at least six Rh<sup>+</sup> donors over 0.95?

★ **BONUS:** A system consists of  $n$  components, each of which will independently function with probability  $p$ . The system will operate effectively if at least one-half of its components function. For what values of  $p$  is a 5-component system more likely to operate effectively than a 3-component system?