Precept 2 outline: Random variables

1. Logistics (2 minutes)
   1. Homework discussion
   2. Review problem set
   3. Key formulas
2. Random variables (2 minutes)
   1. Review definition
   2. Quick examples
3. PMF, PDF, CDF (9:05-9:40)
   1. Die example (9:05-9:18)
      1. Die PMF: 2 minutes
      2. Die PMF figure: 3 minutes
      3. Die CDF: 1 minute
      4. Die CDF figure: 2 minutes
   2. Choose the proper CDF / review properties: (9:18-9:23) 5 minutes
   3. Continuous RVs (9:23-9:40)
      1. Uniform (2 minutes)
      2. Normal (5 minutes)
      3. Dnorm, pnorm, rnorm, qnorm (10 minutes)
4. Expectation (9:40-9:57)
   1. High jumpers (5 minutes)
   2. Linearity of expectation questions (5 minutes)
   3. Flipping a coin 20 times (2 minutes)
   4. Adam’s Law (5 minutes)
5. Variance (9:57-10:11)
   1. Variance questions (5 minutes)
   2. Fine example again (1 minute)
   3. Covariance
      1. Definition (3 minutes)
      2. Marathon example (5 minutes)
6. Benford’s Law (10:11-10:16, 5 minutes)
7. Joint Distributions (10:16-10:22)
   1. Explanation (2 minutes)
   2. Practice problem 1 (2 minutes)
   3. Practice problem 2 (1 minute)
   4. Marginalizing discussion (1 minute)
8. More Practice (10:22-10:57)
   1. Mean and median wealth simulation example (10 minutes)
   2. Coins and conditioning (3 minutes)
   3. Correlation between sum and difference of dice (5 minutes analytic, 5 minutes simulation, 5 minutes plotting)
   4. Independence examples (2 minutes)
   5. Review key formulas and do questions (5 minutes)
9. AFTER SLIDESHOW: Walk through the homework 1 solutions