Homework 2, Stat 100a, due Tue Nov9, 2pm. Submit as a pdf via CCLE, or hand it in in the first 5 min of class.
4.6, 4.8, 4.26, and 5.2.

4.6 In a cash game, suppose you have 8♥ 7♥ and your opponent has K♥ K♦. You are heads-up, and the pot size is $200. The flop comes Q♥ 3♥ 2♣. Your opponent goes all-in, betting an additional $300. You have more than $300 left, so it is $300 more for you to call.

(a) If you call, what is the probability that you will make a flush?

(b) If you call, what is the probability that you will make a flush and your opponent will make a full house?

(c) If you call, what is the probability that you will make a flush and your opponent will make a higher flush?

(d) If you call, what is the probability that you will not make a flush but win the hand anyway?

(e) Combine your answers from parts (a) through (d) to answer the following: If you call, what is the probability that you will win the hand?

(f) Assuming you know exactly what cards your opponent has, should you call? Justify your answer.

4.8 Suppose your opponent reraises all-in before the flop, and you know that she would do this with 90% probability if she had AA, KK, or QQ. If she had any suited connectors, she would do this with 20% probability. With any other hand, the probability that she would reraise all-in is 0. Given that she reraises all-in, what is the probability that she has suited connectors?

4.26 Being tricky can be highly profitable, but giving away free cards can be dangerous. With just 22 players left in the 2015 WSOP Main Event, after an initial raise by John Allen Hinds, Neil Blumenfield reraised with A♠ A♥ and Hinds called with A♦ Q♣. The pot was 2.47 million when the flop came 8♥ 4♣ 10♣. Blumenfield bet just 450,000 and Hinds called. The turn was A♣, Hinds checked, and Blumenfield, perhaps trying to be tricky, checked also. However, the river was 7♣, Hinds bet 1.7 million, Blumenfield called, and Hinds took down the 6.77 million chip pot. Calculate how much expected profit Blumenfield lost due to luck on the river, and compare to how much he lost due to skill on the river.

5.2 Suppose you repeatedly play hands of Texas Hold'em, and let X_1 = the number of hands you are dealt until you get a pocket pair, and X_2 = the number of hands until you are dealt two black cards. Let $Y = min\{X_1, X_2\}$ and $Z = max\{X_1, X_2\}$. Find general expressions for the pmf of Y and the pmf of Z.