

## *Stat 134: Section 3*

*Adam Lucas*

*January 24, 2018*

### *Problem 1*

A biased coin lands heads with probability  $2/3$ . The coin is tossed three times.

- a. Given that there was at least one head in the three tosses, what is the probability that there were at least two heads?
- b. Use your answer in the previous part to find the probability that there was exactly one head, given that there was at least one head in the three tosses.

*Ex 1.6.3 in Pitman's Probability*

### *Problem 2*

Given that there were 12 heads in 20 independent coin tosses, calculate the chance that

- a. the first toss landed heads;
- b. the first two tosses landed heads;
- c. at least two of the first five tosses landed heads.

*Ex 2.1.5 in Pitman's Probability*

Try to do this problem with as little tedious work as possible.

*Problem 3*

A gambler decides to keep betting on red at roulette where there are 18 reds out of 38 tiles in total, and stop as soon as she has won a total of five bets.

- a. What is the probability that she has to make exactly 8 bets before stopping?
- b. What is the probability that she has to make at least 9 bets?

*Ex 2.1.12 in Pitman's Probability*

*Problem 4*

Suppose a fair coin is tossed  $n$  times. Find simple formulae in terms of  $n$  and  $k$  for

- a.  $P(k - 1 \text{ heads} \mid k - 1 \text{ or } k \text{ heads})$
- b.  $P(k \text{ heads} \mid k - 1 \text{ or } k \text{ heads})$

*Ex 2.1.10. in Pitman's Probability*