

Stat 134: Section 3

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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.

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

Ex 2.1.5 in Pitman's Probability

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 a simple formula 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