

Please write ***Your name:*** _____

You may leave your answer in terms of sums, products, factorials or binomial coefficients, and fractions. There is NO need to simplify. NO calculators are needed.

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- (1) Suppose we choose 2 balls at random, one after another without replacement, from a box containing 3 red and 3 blue balls. What is the conditional probability that second ball is red, given that the first one is red?

Answer: $\frac{2}{5}$

- (2) Suppose that 30% of families own a dog, 40% of families own a cat, and 50% of the families have no dogs and no cats. What is the probability that a randomly chosen family has a dog and a cat?

Answer: 20%

- (3) In the same situations, what is the conditional probability that the family who owns a dog also owns a cat?

Answer: $\frac{2}{3}$

- (4) Recall a fictional planet, where the year is 300 days long. In a given year, there are 150 days of rain, 150 days of snow, and 100 days of neither. On a given random rainy day, what is the conditional probability that it also snows?

Answer: $\frac{2}{3}$

- (5) Suppose that 20% of UConn students will be at randomly exposed to the flu. If you are exposed and did not get a flu shot, then the probability that you will get the flu (after being exposed) is 80%. If you did get a flu shot, then the probability that you will get the flu (after being exposed) is only 10%. What is the probability that a person who got a flu shot will get the flu?

Answer: $\frac{20}{100} \cdot \frac{10}{100} = 2\%$

- (6) In the same situation, what is the probability that a person who did not get a flu shot will get the flu?

Answer: $\frac{20}{100} \cdot \frac{80}{100} = 16\%$