# Finite Mathematics (Math 10120), Spring 2020
Quiz 3 Solutions, Friday, February 28, 2020

1. Michelle has a bag containing 12 numbered balls, consisting of two 1's, two 2's, two 3's, two 4's, two 5's and two 6's. She picks two balls in succession, **without replacement**. Let S_1 be the event that she picks a six as her first ball, and N_1 be the event that she does *not* pick a six as her first ball, and similarly define S_2 and N_2 for the second ball. Answer the following three parts. When you answer (b) and (c), you can leave your answers in the form of a fraction, or of a product of fractions, e.g. $\dfrac{1}{13}$ or $\left(\dfrac{1}{4}\right) \cdot \left(\dfrac{3}{7}\right)$.
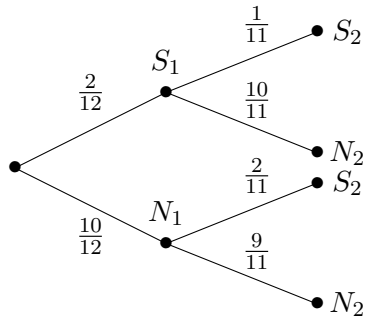
(a) Fill in the probabilities in the above tree diagram.

(b) Find $P(S_1 \cap N_2)$.

> **Answer to (b):** $\quad \frac{2}{12} \cdot \frac{10}{11}$

(c) Find $P(S_2 \mid N_1)$.

> **Answer to (c):** $\quad \frac{2}{11}$

2. A certain class has 7 students. Each student is randomly assigned a number between 1 and 50 (inclusive). What is the probability that **at least two** of the students in this class are assigned the same number? You don't have to do the calculation – you can leave the answer in terms of powers, products, factorials, fractions, combination or permutation notation. (Hint: think complement.)

> **Answer:**
> $$1 - \frac{P(50, 7)}{(50)^7}$$

The complement of the question asked is for all of the students to get different numbers, hence the "1−". The numerator represents the ways the numbers can all be different. The denominator represents all ways of assigning numbers to the seven students.