Exercise 2B.1

Assume that everyone in Ohio Appalachia has a probability of developing lung cancer within the next year of 0.001 and each resident is independent of one another. The population of Ohio Appalachia is 1.5 million. Let X be the number of people in Ohio Appalachia who will develop lung cancer within the next year.

(a) Define the distribution of X.

(b) How many people do we expect to develop lung cancer in this population within the next year?

(c) Calculate the standard deviation of X (be explicit about the units).

Exercise 2B.2

Births in a hospital occur randomly at an average rate of 1.8 births per hour.

(a) What is the probability of observing 4 births in a given hour at the hospital?

(b) What is the probability of observing no births in a given hour at the hospital?

(c) What is the probability of observing 2 or more births in a given hour at the hospital?

(d) How many births do we expect to see in a given hour at the hospital?

Exercise 2B.3

What is the probability that if you throw a (fair, 6-sided) die 10 times it will land on "6" exactly 4 times?

Exercise 2B.4

What is the probability that if you throw a (fair, 6-sided) die 10 times it will land on an even number on exactly half the rolls?