

Introductory Binomial Example: Chapter 15

1. A box contains five tickets, with letters A, B, C, D, E.
 - (a) Eleven draws will be made at random with replacement.

We want to find the probability that exactly four of the tickets drawn will be the B.

 - i. True or false?
 - A. The number of relevant results on each draw is reduced to two possibilities.
 - B. The number of draws is fixed in advance.
 - C. The draws are independent.
 - D. The probability of getting the B on each draw is the same from draw to draw.
 - E. The probability sought is the chance that the result specified (the B) will occur exactly some given number of times out of these draws.
 - F. The result specified (here the B) is represented in the formula by $n - k$ and $1 - p$.
 - ii. Find to the nearest percent, the probability that exactly four out of the eleven draws will be the B.
 - (b) Twenty-five draws will be made at random with replacement.

Find to the nearest percent, the probability that exactly seven out of the twenty-five draws will be the B.
2. On any given day, a certain player purchases one “Millionaire” lottery ticket.

His chances of winning on that day are $1/1,000,000$ (that’s one chance in a million).
He does this for 17,146 days (that’s almost 47 years).

 - (a) Find—to the nearest one tenth of 1%—the probability that he never wins on those 17,146 days which are about 47 years. (The answer will be a percent rounded to one decimal place.)
 - (b) Find—to the nearest one tenth of 1%—the probability that he wins on at least one of those 17,146 days.

(Hint: with logic and the previous result, this should be quite easy to find.)

Answers.

1. (a) i. A. True.
B. True.
C. True.
D. True.
E. True.
F. False.
ii. 11%.
(b) 11%.
2. (a) 98.3%.
(b) 1.7%.