

Lotto 649

4 marks

In class, a time scale was used to indicate the average time it would take to first win Lotto 649, purchasing 1 ticket per weekly draw. Assume that a winning ticket is one which matches the 6 numbers drawn from 1 to 49.

- a. (1 mark) Suppose p is the probability of winning the grand prize. Write down the value for p for Lotto 649.

The probability of winning is $p = \frac{1}{\binom{49}{6}} \approx 7.1511 \times 10^{-8}$.

- b. (1 mark) Write down the probability of winning (**for the first time**) on the n th draw (i.e. losing on the first $n - 1$ draws).

The probability of winning on the n th draw is $(1 - p)^{n-1}p$ where $p = \frac{1}{\binom{49}{6}}$.

- c. (1 mark) Determine the expected number of draws you must play (1 ticket each draw) before winning for the first time.

The expected number of draws you must play is $\frac{1-p}{p} = 13983815$.

- d. (1 mark) Show how the average time to win Lotto 649 when playing 1 ticket per weekly 649 draw turns into the long wait given for the Homo sapiens example (as described in the slides)

(13983815 + 1)/52.14

[1] 268197.5

Since there are around 52.14 weeks in a year. We obtain that we need to wait for 268198 years to win the prize, which is around 268000 years.