

# Assignment 1

## Exercise 1:

a) There are 52 different cards

$$\binom{52}{5} = \frac{52!}{5! (52-5)!} = 2\,598\,960$$

$$b) \frac{1}{2\,598\,960}$$

c) Royal straight flush  
(Ace, king, queen, jack, 10 of  
+ suit)

4 different ways, (heart, spades, clubs, diamonds)

$$P(\text{royal flush}) = \frac{4}{2598960} = \frac{1}{649740}$$

$$P(4 \text{ of a kind}) = \frac{13 \cdot 12}{2598960} = \frac{1}{16660}$$

## Exercise 2

Bar, bell, Lemon or cherry

Bar / Bar / Bar	→	20 coins
Bell / Bell / Bell	→	15 coins
Lemon / -  - / -  -	→	5 coins
cherry / cherry / cherry	→	3 coins
cherry / cherry	→	2 coins
cherry	→	1 coin

$$P(\text{bar} / \text{bar} / \text{bar}) = \frac{1}{4^3} = \frac{1}{64}$$

$$P(\text{bell} / \text{bell} / \text{bell}) = \frac{1}{64}$$

$$P(\text{Lemon} / \text{Lemon} / \text{Lemon}) = \frac{1}{64}$$

$$P(\text{cherry} / \text{cherry} / \text{cherry}) = \frac{1}{64}$$

$$P(\text{cherry} / \text{cherry}) = \frac{1}{4} \cdot \frac{1}{4} \cdot \frac{3}{4} = \frac{3}{64}$$

$$P(\text{cherry}) = \frac{1}{4} \cdot \frac{3}{4} \cdot \frac{3}{4} = \frac{9}{64}$$

$$E(X) = \sum x_i p_i = \frac{20}{64} + \frac{15}{64} + \frac{5}{64} + \frac{3}{64} + \frac{2 \cdot 3}{64} + \frac{9}{64}$$

$$\approx 0.91$$

b)

$$P(\text{winning}) = \sum \text{win} = \frac{9}{64} + \frac{3}{64} + \frac{9}{64} = \frac{16}{64} = \underline{\underline{0.25}}$$

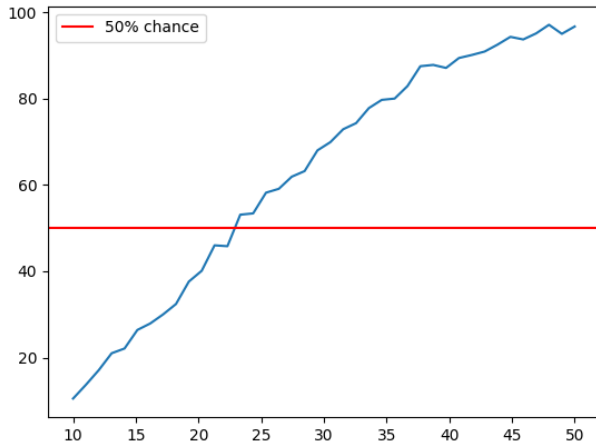
c)

The simulation gives the median = 18.0 and the mean = 105.38416

# Exercise 3

## exercise 3, Part 1

Smallest number of N where the probability of the event occurring is 23



## Exercise 3 Part 2

expected size of Peters group is 2359.4005, (after 2000) simulations

codes is delivered as  
separate files