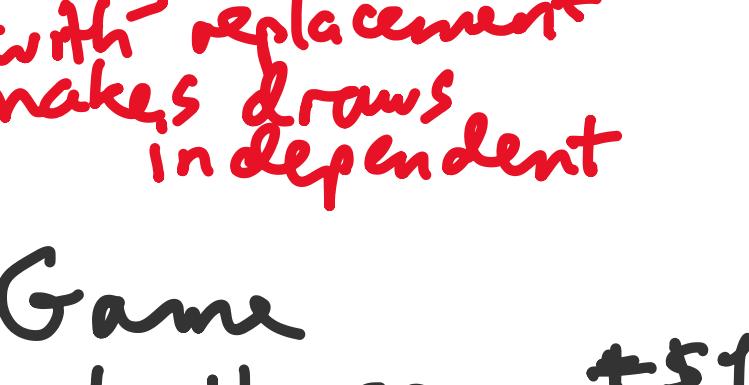


Chapter 16

Ch 13, 14, 15 first

Ch 16 brief comments



draw 1 ticket randomly

Repeat draws

with replacement

Drawing with replacement makes draws independent

without replacement?

for Ch 16

Come back to dependent draws later

Game

get +1 earn +51
drew -1 lose \$1Goal: keep track of total win/loss
" " " " sum many draws

Main Skill Ch 16: Set up a box

to match a word problem

One more main point Ch 16

Law of Averages

Requests?

A 4 (a)

Win if $\geq 60\% H$
better $< \frac{100-fosses}{100-fosses}$ #fosses \longleftrightarrow variability from expectExpect (\pm percent H) Ch 13 $P(10 H \text{ in a row in } 10 \text{ tosses})$

$$= \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdots \frac{1}{2} = \left(\frac{1}{2}\right)^{10} = \frac{1}{1024}$$

more tosses (draws) \rightarrow more accuracy in percent

with 100 tosses, % H's will be closer to expected than with 10 tosses

P 287 1. Law of Averages

"error" = deviation from expected

"relative error" = percent

4(b) Win $> 40\%$ want to be close to expected want less deviation \rightarrow smaller error \rightarrow more tosses Ans 100(c) far from 50%?
want $\xleftarrow{\text{close to } 50\% ?}$ $\xrightarrow{\text{want } 100 \text{ tosses}}$

(d) win if exactly 50% H

 $P(\text{get } 5H \text{ in } 10 \text{ tosses}) = ?$ higher?exactly $P(\text{get exactly } 5H \text{ in } 10 \text{ tosses}) = ?$ $n=10 k=5 p=\frac{1}{2}$ $P = \frac{10!}{5!5!} \left(\frac{1}{2}\right)^5 \cdot \left(\frac{1}{2}\right)^5 = \frac{252}{1024} \sim 25\%$ $n=100 k=50 p=\frac{1}{2}$ $P = \frac{100!}{50!50!} \left(\frac{1}{2}\right)^{50} \left(\frac{1}{2}\right)^{50} \text{ true but impractical}$ $100! > 10^{100}$

A5 (there is no B9)

C1 Do not memorize roulette table

some draw! win if get 1

win either with $P=90\%$

(i)

(ii)

some draw! win get 1

(iii)

intuition: sum of 10 draws ~ 9

sum win if sum ≤ 10

(i) better than (ii) intuitively

 $P(\text{sum of 10 draws is } 10) = ?$ (Hard)
(box (iii))C2 "pays 17 to 1" $P(\text{win}) = \frac{1}{37}$ *

build box

box # (iii)

C3 "pays 36 to 1" $P(\text{win}) = \frac{1}{36}$

1 win 215 lose

10

the box with one ticket labeled +36 and 215 tickets labeled -1.