Discussion section, week of 22–26 Oct 2018

Reader p. R-39 #5 (9)

AMS 7 22 Oct 18

probability > 1 or < 0 are meaningless ①

pop

$\begin{bmatrix} 1 \\ 2 \\ 9 \end{bmatrix}$ at random → ELM ✓

sample

$[X_1]$ $n=1$

$P(X_1 \text{ is odd}) = \frac{2}{3}$

L-190

2nd toss

1st toss	H	T
H	HH	HT
T	TH	TT

Q: does ELM apply to these 4 possibilities?

A: yes

P(exactly 1 H in 2 tosses of fair coin)

$= \frac{2}{4} = 50\%$

Scar is time

sum	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

1st die

2nd die

Q: Does Elm "apply" to these 36 possibilities?

A: Yes, because dice-rolling is fair

$$P(3 \text{ as sum of 2 dice}) = \frac{2}{36} = \frac{1}{18} \doteq 5.6\%$$

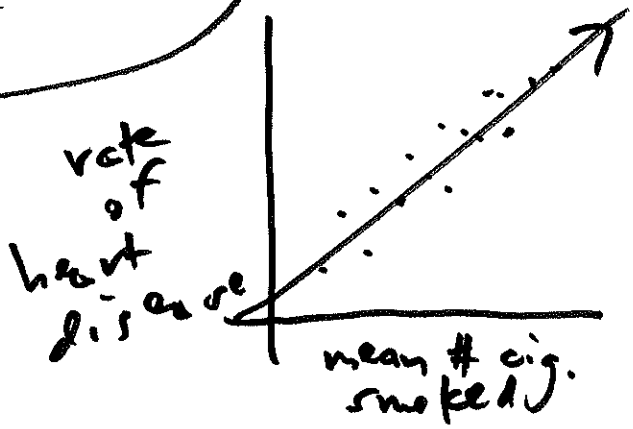
$$P(7 \text{ as sum of 2 dice}) = \frac{6}{36} = \frac{1}{6} \doteq 17\%$$

Epidemiologist (1958)

(UK) R. Doll

1959 Surg. Gen: smoking bad

1700s Snow UK cholera



1 row for each country

P(both smokers die 1ST given Fisher's story)

= P(HH in 2 tosses of fair coin)

= $\frac{1}{4}$ = 25% weak evidence against Fisher

P(all 9 smokers die first, given Fisher's story) =

= P(HHHHHHHHH in 9 tosses of a fair coin)

= $\frac{1}{512}$ = $\left(\frac{1}{2}\right)^9$

≈ 0.2%

≈ 0.0002

extremely small, so Fisher's story probably wrong

R - 38 39 #3 (a) (i) F
(ii) T
(iii) F