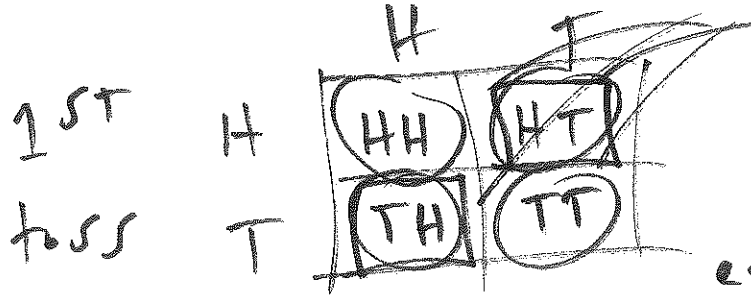
Discussion section (week of 1-5 May 17) | Disc. sec. 3 | Ans 2 May

J. R - (39)

(1)

5(9) fair = (50% H, 50% T) + (all tosses independent)



Hyp: 4 outcomes are equally likely by fairness of the coin, so Ell ✓

P(exactly 1 H in 2 tosses) = $\frac{2}{4} = 50\%$

P(at least 1 H) = $\frac{3}{4}$

5(b) possible sums of 2 dice (faces upward on) are:

2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

if Ell applied to these outcomes, then P(3) = $\frac{1}{11}$ and P(7) = $\frac{1}{11}$

but FLM doesn't apply to that way of writing down the possibilities.

1st die \ 2nd die	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

36 equally likely outcomes: FLM ✓

$$P(3) = \frac{2}{36} = \frac{1}{18} \doteq 5\%$$

$$P(7) = \frac{6}{36} = \frac{1}{6} \doteq 17\%$$

6. $P(2H \text{ in } 2 \text{ tosses of fair coin} \mid CH)$

$= (2 \times 2 \text{ table}) = \frac{1}{4} = 25\%$ (earlier)

$P(\text{all 9 smokers die first w/ heart disease} \mid CH)$

$= P(HH\,HH\,HH\,HH\,HH \text{ in 9 tosses of fair coin})$ (HH on 1st and ...)

$= P(H \text{ on 1ST and } H \text{ on 2ND and } \cdots \text{ and } H \text{ on 9th})$

indep $= P(H \text{ on 1ST}) \cdot P(H \text{ on 2ND}) \cdot \cdots \cdot P(H \text{ on 9th})$

$$\underbrace{\left(\frac{1}{2}\right)\cdot\left(\frac{1}{2}\right)\cdots\left(\frac{1}{2}\right)}_{9} = \frac{1}{2^9} = \frac{1}{512}$$

$$\approx \frac{1}{500}$$

$$= \frac{1}{5}\left(\frac{1}{100}\right)$$

$$= 0.2\%$$

if CH correct, extremely rare data resulted;

therefore CH is probably wrong.

1.) outcome fitness on 0-100 scale

	1st year		2nd year		
person #	before	after	before	after	different person #
1	75	90	?	71	n+1
2	82	89	?	58	⋮
⋮	⋮	⋮	⋮	⋮	
n	91	90	?	80	n+m
mean	(80)	92	est. 55	69	

ironically, when health improvement programs are offered voluntarily,

the people who volunteer are by and ⑥
large (on average) the people who need
it the least (i.e., the volunteers are
health conscious & therefore
quite healthy to begin with)

---

3. (a) (i) obviously false

(ii) true (iii) false: randomization
will balance out the PCFs