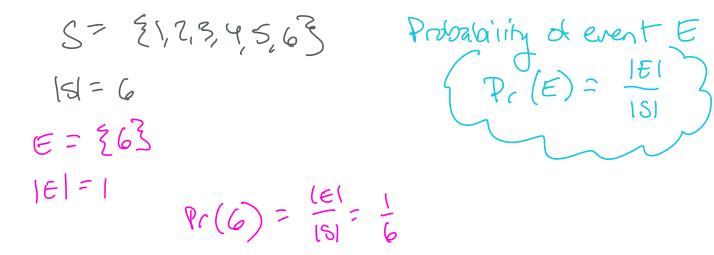
(S1800 10/20-Fi !!

Admin

- · HWS out next Fri
- · Back to recitations next week

Agendra 1. Basic Probability Counting 2. Expected Value Sets 3. Vaniance

- · <u>Experiment</u> ~ procedure, a repeatride, well-defined Set of Butumes
- · Sample space Set of all possible at comes of an experiment S=ZS, Sn, ..., Sn}
- · event space subset of sample space ESS



 $E = 22, 4, 6^{3}$ $Pr(eren) = \frac{|6|}{|5|} = \frac{3}{6} = \frac{1}{2}$ $|6| = \frac{1}{2}$

Rolling toodice $Aie \pm 1$ $S = \frac{2}{5} |_{12, 5, 4, 5, 6, 7} = \frac{16}{3}$ $Aie \pm 2$ $S_2 = \frac{2}{5} |_{12, 3, 4, 5, 6, 7} = \frac{16}{3}$ (arterian product - ordered pairs $\frac{2}{5} (1, 1), (1, 2), (1, 3) \dots, (6, 6)$ $|S \times S_2| = 36$ Sample space $E = \frac{2}{5} (3, 4), (4, 3)^{\frac{2}{5}} = \frac{1}{15}$

(*) (raps in Old Veras
First roll
$$\sim$$
 sum of \exists dive
• win: \exists , 1(
• lose: $2, 3, 12$
Pr(win)?
I>1= 36
 $E = \{(1, 6), (6, 1), (3, 4), (4, 5), (25, 2), (6, 5), (5, 6)\}$
 $(25), (5, 2), (6, 5), (5, 6)\}$
 $|E| = 3$
 $|E| = 3$

Q: why roll two dive |s| = 36A = $\frac{2}{1}, 2, \frac{2}{5}, 4, \frac{5}{6}, \frac{63}{5}$ (a, b) to get Axis B = $\frac{2}{5}, 2, \frac{3}{5}, 4, \frac{5}{6}, \frac{63}{5}$ (1, -) (2, -) (2, -) (3, 5, 4, 5, 63) (1, -)

$$Pr(neitner) = [-3/q] \qquad > subtraction (lamplement) = 6/q = 2/3$$

$$\begin{bmatrix} 1 & peuple \end{bmatrix} = 1.65 e^{-11}$$

$$P(at least one born insep) Pr(none both in Sep)
$$\begin{bmatrix} -Pr(none insept) \\ -(\frac{11}{12})^{10} = .58 \\ Sslotnetin rule. \\ (1521: exactly one (152: exactly two) \\ ... \\ (75e 10: exactly 10 mg). \end{bmatrix}$$$$

· everything in sample (Cit) Larry's bet on Aces to win !! X = RV 2-sociated with outcome of game (\$) 2 outcomes: win, lose Every aut come has prob. and value Pr(Si) X: Pr(win) = .60 Pr(low) = .40 $\chi_{win} = 30$ $\chi_{lose} = -30$ E[X] = (.60)(30) + (.40)(-30)- \$6

E[x] = (.5)(0) + (.5)(1) = .5

For everyone h	ip a coin 3 time	-S (experiment)
• $\# fzuils(X)$		
· ovt comes-	HHH, HHT, HT	H THH,
E[X] = ? $E[X] = \sum Pr(S_i) \cdot X_i$		
R(X=0) = Y8	ННН	
7c(X=1) = 3/8	THH, HTH, HAT	Sanity check: V_{5} , $3V_{5}$, $3V_{5}$, V_{5} = 1
Pr(X=2) = 3/8	TTH, THT, HIT	15 × 3/5 × 3/5 + 1/5=1
R-(X=3) = Y8	TTT	

 $E[X] = \frac{1}{8} \cdot 0 + \frac{3}{8} \cdot 1 + \frac{3}{8} \cdot 2 + \frac{3}{8} \cdot 3$ Pr(X=3) trave $= 0 + \frac{3}{8} + \frac{6}{8} + \frac{3}{8}$

= 12/8 = 1.5

Shortcut EV formula Z lengenty of expectation same experiment Z lengenty of expectation E[t+tails in 3 + 05xs] = E[t+tails in toos 1] + E[t+tails in toos 2] + E[t+tails in toos 3] E[X] = .5 + .5 + .5 = 1.5 3frips E[t+tails in toos 1] = 0 + 5 + 1 + .5 = .5Gindicators