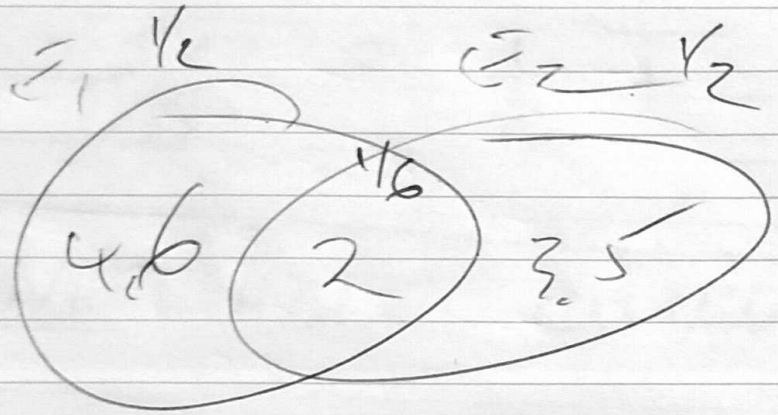
1/14/19

DISCRETE

DIE = OUTCOME: 1, 2, 3, 4, 5, 6

EVENTS EVEN $E_1 = \{2, 4, 6\}$

PRIME $E_2 = \{2, 3, 5\}$ ← $P = 1/2$



CONTINUOUS OUTCOME

WEIGHT $\sigma = 50$

$E_1 = \{50 \leq \omega_1 \leq 60\}$

$E_2 = \{52 \leq \omega_1 \leq 58\}$

PROBABILITIES

FAIR DIE

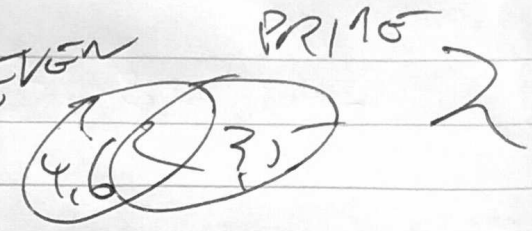
$P(1) = 1/6$

$P(2) = 1/6$

$P(E_1) = 1/2$

$P(E_2) = 1/2$

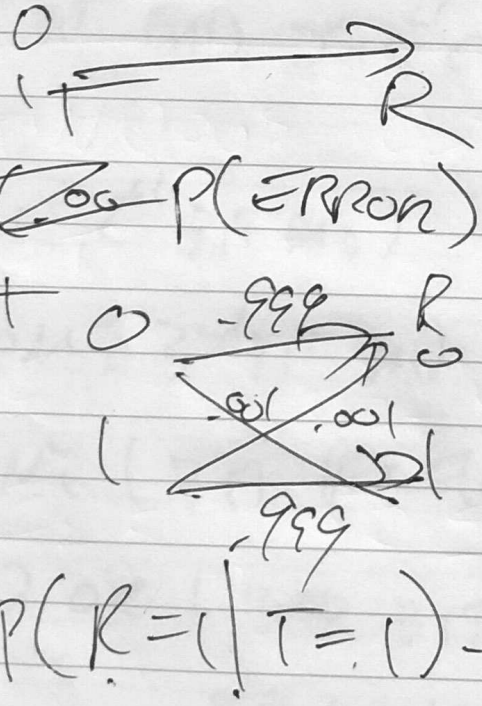
EVEN PRIME



$P(E_1 \cup E_2) = P(E_1) + P(E_2) - P(E_1 \cap E_2)$

$5/6 = \frac{1}{2} + \frac{1}{2} - \frac{1}{6}$

UNRELIABLE CHANNEL



MAKE IT MORE RELIABLE

TRANSMIT 3 TIMES TVOTE.

XMIT 000 RCV 001 ASSUMES 0

011 1 ERROR

$b_1 b_2 b_3$

$P(\text{ALL 3 RCV OK}) = .999^3$

$P(1^{st} \text{ BIT BAD}, 2^{nd}+3^{rd} \text{ GOOD}) = .001 \times .999^2$

$= .000998$

$P(\text{ONLY } 2^{nd} \text{ BIT BAD}) = .000998$

$P(\text{ONLY } 3^{rd} \text{ BIT BAD}) = .000998$

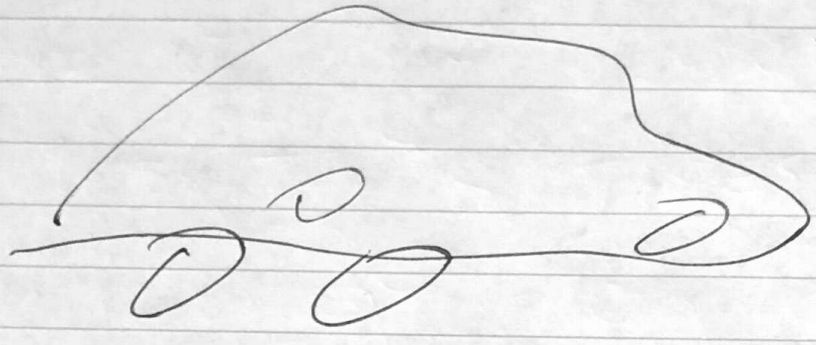
$P(\text{ANY 1 BIT RECEIVED WRONG}) = .003$

$P(\text{0 OR 1 BAD BITS}) = .999997$

REMIX

ASSUMES INDEPENDENCE

4



4 WHEELS P(FLAT) = .01

P(CAR DISABLED) ?

P(NO FLAT) = $.99^4$ = .96

CAR IS LESS RELIABLE THAN EACH TIRE

ALL 4 TIRES MUST WORK.