

PROBABILITY

IN PROBABILITY - AN EXPERIMENT IS AN ACTION

THAT HAS A MEASURABLE OR QUANTIFIABLE RESULT.

IE - ROLL A DIE, RECORD THE NUMBER

- MEASURING THE HEIGHTS OF STUDENTS

- THE SAMPLE SPACE IS THE SET OF ALL POSSIBLE OUTCOMES FOR THE EXPERIMENT

- AN EVENT IS ANY COLLECTION OF OUTCOMES

- IN AN EXPERIMENT WITH OUTCOMES THAT ARE EQUALLY LIKELY, THE PROBABILITY THAT A PARTICULAR EVENT WILL OCCUR IS GIVEN BY:

$$P(\text{EVENT}) = \frac{\# \text{ OF FAVOURABLE OUTCOMES}}{\text{TOTAL \# OF OUTCOMES IN THE SAMPLE SPACE}}$$

- THEORETICAL PROBABILITY - WHAT WE CALCULATE AS THE PROBABILITY OF AN EVENT

$$\text{OR } P(H) = \frac{1}{2}$$

- EXPERIMENTAL PROBABILITY - WHAT THE PROBABILITY IS WHEN AN EXPERIMENT IS DONE.

ITS TDS A COIN 200 TIMES AND GET 105 HEADS AND 95 TAILS.

- PROBABILITY THAT AN EVENT DOES NOT OCCUR IS CALLED THE COMPLEMENT. FOR ANY EVENT

$$"A" \text{ THE } P(A) + P(\bar{A}) = 1$$



COMPLEMENT

- IN SOME CASES IT IS EASIER TO CALCULATE THE PROBABILITY OF AN EVENT BY CALCULATING ITS COMPLEMENT.

CLASSIFYING EVENTS

- IN AN EXPERIMENT, TWO EVENTS ARE INDEPENDENT IF THE PROBABILITY THAT EACH EVENT WILL OCCUR IS NOT AFFECTED BY THE OCCURRENCE OF THE OTHER EVENT

IS $P(A \cap B)$ AND $P(A)P(B)$

- IN A SINGLE EXPERIMENT, TWO EVENTS THAT SHARE

NO COMMON OUTCOMES ARE CALLED MUTUALLY EXCLUSIVE.

IS SELECTING A GIFT

1ST EVENT IS ITS BEING

2ND EVENT IS A MUSIC CD.

76 ROLLING A DICE

1ST EVENT EVEN NUMBER

2ND EVENT IT'S A PRIME NUMBER

1ST : 2, 4, 6 2ND BOTH ∴ NOT MUTUALLY EXCLUSIVE
2ND : 1, 2, 3, 5

- THE PROBABILITY OF A AND/OR B IF MUTUALLY EXCLUSIVE

$$P(A \text{ OR } B) = P(A) + P(B)$$

$$P(A \text{ AND } B) = 0 \rightarrow \text{EXERCISE C)}$$

THE $P(\text{1 roll on EVEN \#}) = \frac{1}{6} + \frac{3}{6} = \frac{4}{6} = \frac{2}{3}$

- PROBABILITY OF A AND B NOT MUTUALLY EXCLUSIVE

$$P(A \text{ AND } B) = P(A) + P(B) - P(A \text{ AND } B)$$

THE $P(\text{EVEN \# on PRIME}) = \frac{3}{6} + \frac{4}{6} - \frac{1}{6} = \frac{6}{6} = 1$

THE 85% READ AT LEAST 1 NEWS PAPER

35% READ AT LEAST 1 BOOK

25% READ BOTH

WHAT IS THE PROBABILITY A PERSON

A) READS BOOKS ONLY

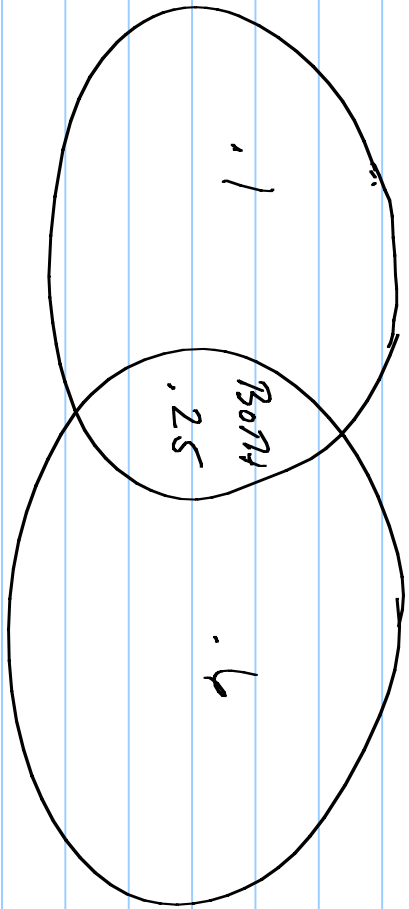
B) READS EITHER BOOKS OR NEWS PAPER

SOLN

BOOKS

NEWSPAPERS

NEITHER = .05



A) $P(\text{BOOKS ONLY}) = 10\%$

B) $P(\text{BOOKS}) + P(\text{NEWSPAPERS})$

$.1 + .4 = 70\%$

IF 2 DICE ARE ROLLED, WHAT IS THE PROBABILITY
 THE SUM OF THE DICE IS EVEN OR AN ODD
 NUMBER?

<u>SUM</u>	2 ND					
	1	2	3	4	5	6
1 ST	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

$$= P(\text{EVEN}) + P(\text{ODD}) - P(\text{EVEN} \& \text{ODD})$$

$$= \frac{18}{36} + \frac{15}{36} - \frac{1}{36} = \frac{32}{36} = \frac{8}{9}$$

H/w P₄ Y₀₅ # 1-4, 9

Y₁₄ # 1-4, 6-12

Y₂₃ # 1-5, 10