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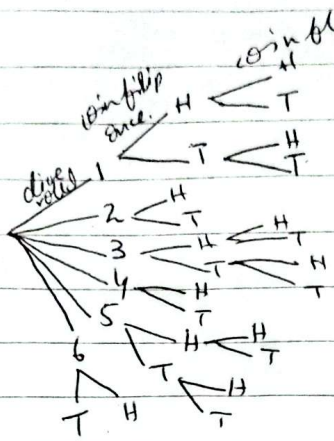
BSSE23058

Date: Day:

Assignment #2.
Probability & Statistics

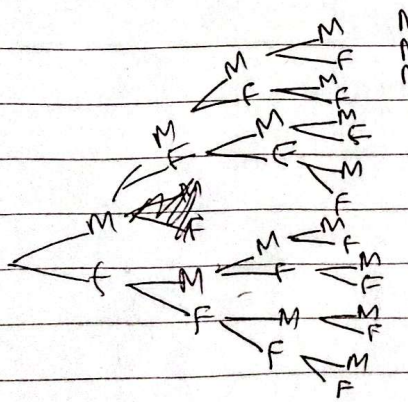
2.5



1HH
1HT
1TH
1TT
2H
2T
3HH
3HT
3TH
3TT
4H
4T
5HH
5HT
5TH
5TT
6H
6T.

S = {1HH, 1HT, 1TH, 1TT, 2H, 2T, 3HH, 3HT, 3TH, 3TT, 4H, 4T, 5HH, 5HT, 5TH, 5TT, 6H, 6T}

2.7



	Females
MMMM	0
MMMF	1
MMFM	1
MMFF	2
MFMM	1
MFMF	2
MFFM	2
MFFF	3
FMMM	1
FMMF	2
FMFM	2
FMFF	3
FFMM	2
FFMF	3
FFFM	3
FFFF	4

S_1 = {MMMM, MMMF, MMFM, MMFF, MFMM, MFMF, MFFM, MFFF, FMMM, FMMF, FMFM, FMFF, FFMM, FFMF, FFFM, FFFF}.

S_2 = {no of females}

S_2 = {0, 1, 2, 3, 4}

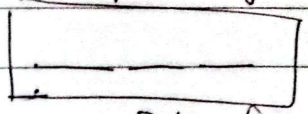
Date: Day:

2.22 - 8 blood types.
- 3 blood pressure levels

no. of ways to classify a patient = blood type × bp level
$= {}^{8}C_1 \times {}^{3}C_1$
$= 8 \times 3$
$= 24$ ways

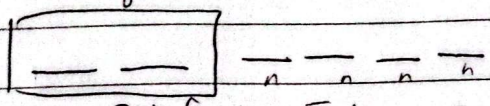
2.32 (a) 6 people be lined. ${}^{6}P_6$
$6 \times 5 \times 4 \times 3 \times 2 \times 1 = 6!$
$= 720$ ways.

(b) 3 people together.



$3! \times 4!$ → arranging with the box.
$= 6 \times 24$
$= 144$ ways

(c) 2 together.



$2! \times 5! = 240$ ways
if two people must always stand together

two people who don't stand together = ?
if no arrangement is given, just random people
arrangement = $6! = 720$ ways

two people who don't stand together = All ways − 2 people who always stand together
$= 720 - 240$
$= 480$ ways

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2.48 If normal non leap year = 365 days

students = 60.

$365 P 60 = \frac{365!}{(365-60)!}$

= too large calculator can't calculate

for leap year = 366 days

$366 P_{60} = \frac{366!}{(366-60)!}$

= can't calculate by calculator,

2.114 Total set = 12.

defective = 3 non-defective = 12-3 = 9

Choose = 5

defective at least 2.

(D >= 2)

if two are defective & three normal

[D D] [N N N]

2D $^3C_2 = 3$

3N $^9C_3 = 84$

$84 \times 3 = 252$

if 3 defective & 2 Normal

[D D D] [N N]

3D $^3C_3 = 1$

2N $^9C_2 = 36$

$36 \times 1 = 36$.

total no. of ways 252 + 36

= 288 ways

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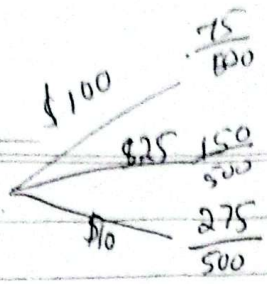
251



Sample space for diff amount of money
S = {$10, $25, $100}

P(1st envelope less than $100) = envelope contains $10 P($10)
+ envelope contains $25 P($25)

$$= \frac{275}{500} + \frac{150}{500}$$

$$= \frac{17}{20} = 0.850$$

2.63 (a)

P(PC in bedroom) = P(AB) + P(CB) + P(OB)
= 0.03 + 0.15 + 0.14
= 0.32

(b) P(PC not in bedroom) = 1 − P(PC in bedroom)
= 1 − 0.32
= 0.68

(c) P(PC in bedroom) 0.32 = 32%
P(PC in Office or den) = 0.40 = 40%
P(other rooms) = 0.28 = 0.28%
The highest probability is the Office or Den with 40% chance.

2.75 ~~(a) P(Male) = 200~~
~~P(Male and Secondary Education) = 28~~
~~200~~
~~= 7/50 = 0.14~~

(b) P(female and ! college) = P(F and E) + P(F and S)

$$= \frac{45}{200} + \frac{80}{200} = \frac{19}{40} = 0.475$$

~~Ans 0.475~~

Date:

2.75 P(total) = 200 P(secondary) · P(F) + P(M+S) · $\frac{28+50}{75}$

(a) P(Male | secondary) · $\frac{P(\text{Male} \cap \text{Secondary})}{P(\text{Secondary})}$

$= \frac{28}{75}$

$= 0.373$

(b) P(~~Female~~ + Non-College | female)

$= \frac{P(\text{!College and Female})}{P(\text{Female})}$

P[female) = 45+50+17 = 112

~~P(!college)~~ =

P(!college and female) = P(S and F) + P(E and F)

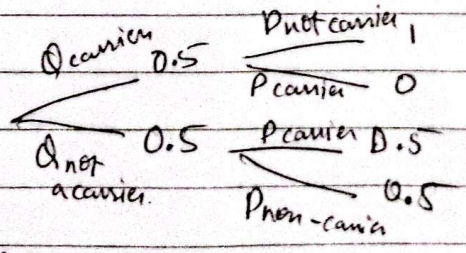
= 45 + 50

= 95

$P(\text{!College} \mid \text{female}) = \frac{95}{112}$

= 0.848

2.127



P(QC) = 0.5

P(PNC | QC) = 0.5

Three sons

$= (0.5)^3 = 0.125$

Day:

using Bayes Rule.

$$P(QC \mid PNC) = \frac{P(PNC \mid QC) \times P(QC)}{P(PNC)}$$

Total Probability $P(PNC) = ?$

$$P(PNC) = P(QC) \times P(PNC \mid QC) + P(QNC) P(PNC \mid QNC)$$

$$= (0.5 \times 0.125) + (0.5 \times 1)$$

$$= 0.5625$$

$$P(QC \mid PNC) = \frac{0.5 \times 0.125}{0.5625}$$

$$= \frac{0.0625}{0.5625}$$

$$= 0.111$$