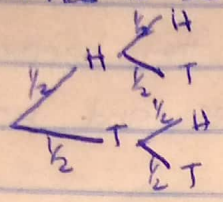
① (a) Tossing heads with a single coin

Coin has to be tossed twice to get full outcome

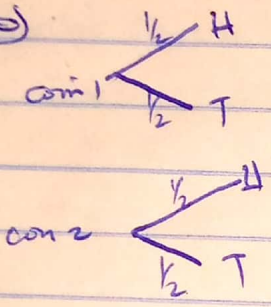


$HH + HT + TH$

$\frac{1}{2} \times \frac{1}{2} + \frac{1}{2} \times \frac{1}{2} + \frac{1}{2} \times \frac{1}{2} = 3/4$

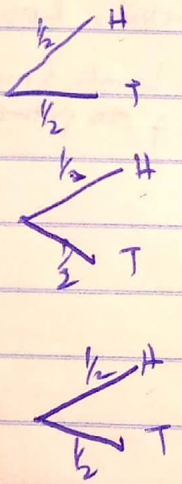
Or $1 - TT = 1 - 1/4 = 3/4$

b)



$H \times H = 1/2 \times 1/2 = 1/4$

c) At least one head with 3 coins



Probability of getting all tail $= 1/2 \times 1/2 \times 1/2 = 1/8$

$P(H) = 1 - (P(T) = 1 - 1/8 = 7/8$

(d) Composite numbers $= 4$ and 6, sum $= 2$.

$P = \frac{No}{All} = \frac{2}{6} = 1/3$

(e) Perfect squares are generated by 1×1, 1×4, 2×2, 4×1, 4×4, 5×5, 6×6

Scanned with CamScanner

$P = \frac{N(A)}{N(S)} = \frac{8}{36} = \frac{2}{9}$

(f) There are 12 black face cards

$P = \frac{N(A)}{N(S)} = \frac{12}{52} = \frac{3}{13}$

2. a) Probability is 1 because the sun must rise

b) Probability is 0 because it must rain because it has never not rained

c) Probability is 80% depending on past performances on a similar course and confidence

(d) Probability is 50% because options are that you may or may not be considered for the job

(k) a) $P(\text{resident owns a home}) = \frac{N(A)}{N(S)} = \frac{10000}{16000} = \frac{5}{8}$

(b) P(resident rents and has lived at present address for less than 2 years)

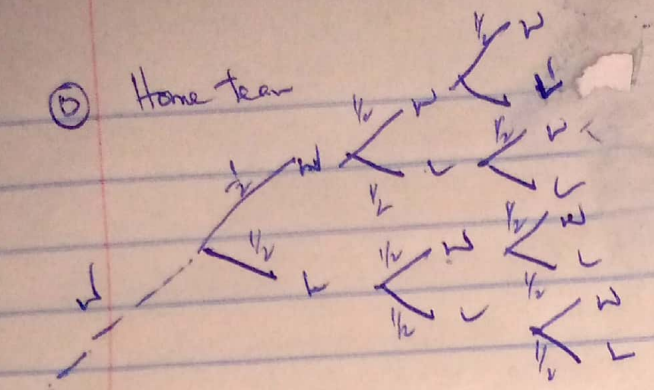
$= \frac{N(A)}{N(S)} = \frac{4500}{16000} = \frac{9}{32}$

(c) P(homeowner has lived at present address more than 2 years)

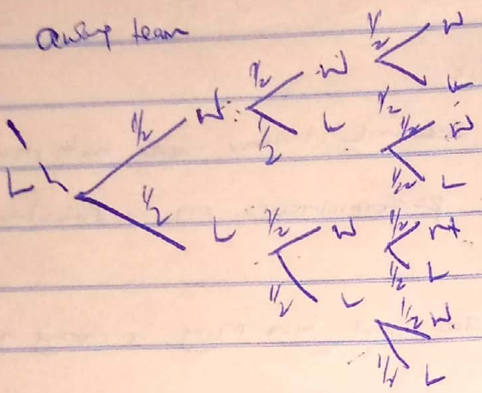
$= \frac{N(A)}{N(S)} = \frac{8000}{16000} = \frac{1}{2}$

Scanned with CamScanner

(5) Home team



away team



b) My team being the away team

2 games = WWL + WLW + LWW +

= 1/8 + 1/8 + 1/8 = 3/8

c) ~~Based on previous experience~~ for

Probability of winning 4 matches out of = 1/2 × 1/2 × 1/2 × 1/2 = 1/16

4/6 = 2/3

d) In part c we assumed that out of the 6 played games, my team won 4. ie. WWWW = 1/16

6. 1 and 10

1 (2) (3) 4 (5) 6 (7) 8 9 10

Prime numbers circled = 4

$P = \frac{N(A)}{N(S)} = \frac{4}{10} = \frac{2}{5}$

(7) a) A = 5, 7, 9

B has the advantage. because B excludes ~~6~~ only the ~~other~~ choices of A which are few. A has 14/36, B has 22/36

Scanned with CamScanner

9 (b) 5, 7, doubles

A has $16/36$, B has $20/36$, therefore B has advantage.

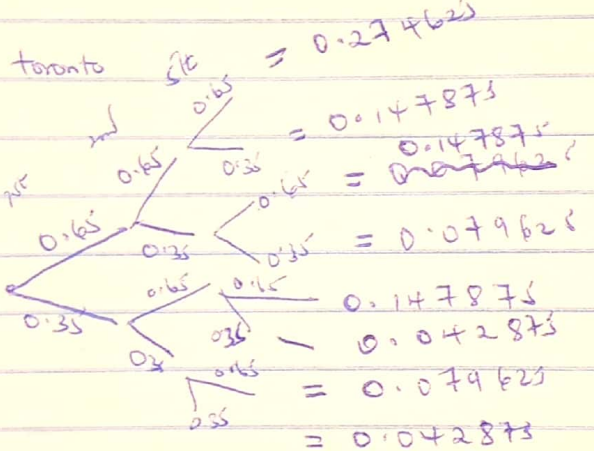
(c) Player A wins if numbers showing on both dice is 3 or less and B wins if numbers showing on both are greater or equal to 4

8. Probability of being female $= 1/2$ because there are only 2 options

$P(A) = 1 - P(A) = 1 - 1/2 = 1/2 \Rightarrow 1/2 \times 10 = 5$ bucks.

10.

At toronto



$= 0.274625$

$= 0.147875$

0.147875

$= 0.079625$

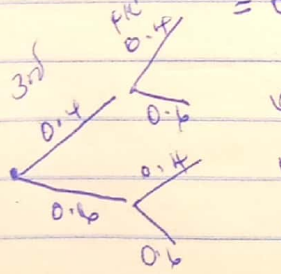
$= 0.147875$

$= 0.042875$

$= 0.079625$

$= 0.042875$

At New York



$= 0.16$

0.24

0.24

0.36

b) $= 0.65 \times 0.65 \times 0.4 + 0.4 \times 0.4 \times 0.65 = 0.273$

d) in part b, combine probability of Toronto winning 2 straight games at Toronto and another game in New York and the probability of winning 2 games in New York and the fifth game in Toronto

Scanned with CamScanner

for part c, outcomes of each place is handled seperately.

12/a) The student should choose 1/4 of all choices being B at random and 3/10 being Cs at random and the rest As, Ds and Es. In short C should be chosen more often

b) The student would change their answers choices after every 2 questions for 10% of the time and make C after choice for the rest of the time.

Scanned with CamScanner