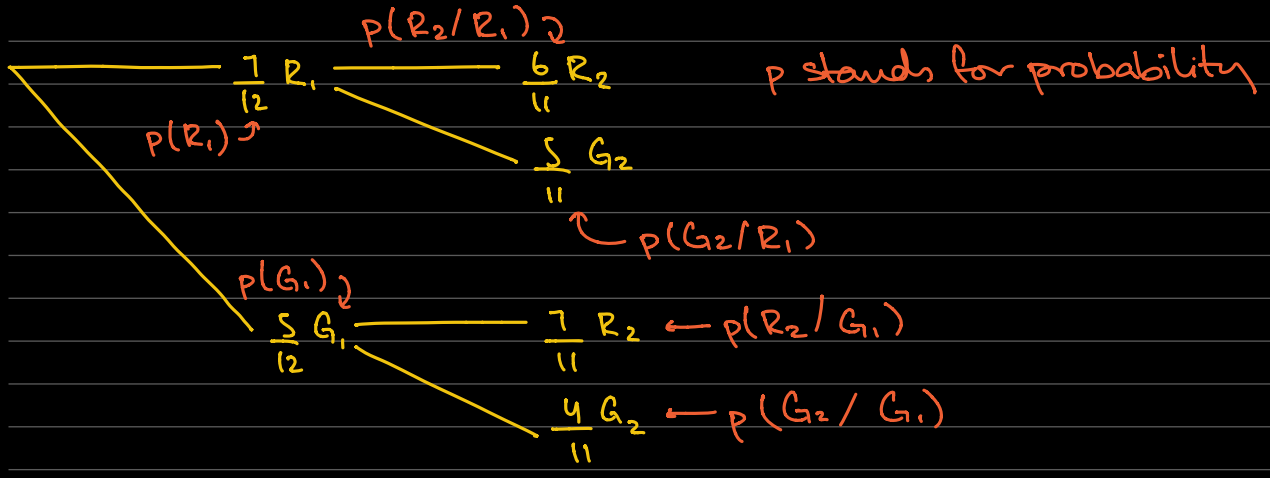
PROBABILITY

A bag of 7 reds, 5 green

Pick 2 counters (without replacement)



p stands for probability

$$p(R \cap R_2) = P(R_1) \times P(R_2/R_1)$$
$$= \frac{7}{12} \times \frac{6}{11} = \frac{7}{22}$$

R_1 = event A, R_2 = event B

GRM

$p(A \cap B) = p(A) \times p(B/A)$ → General Rule of Multiplication

$p(B/A) = \frac{p(A)}{p(A \cap B)}$ → Conditional Probability Formula

if done w/ replacement:

$p(R_2/R_1) = p(R_2)$ → condition for independence

$p(B/A) = p(B)$

Special case of GRM → $p(A \cap B) = p(A) \times p(B)$ → this implies that A and B are independent

Example :

Given :

$p(A) = 0.2$
$p(B) = 0.1$
$p(A \cap B) = 0.05$

Q. Are events A and B independent

$p(A \cap B) = p(A) \times p(B)$ would mean that they're independent

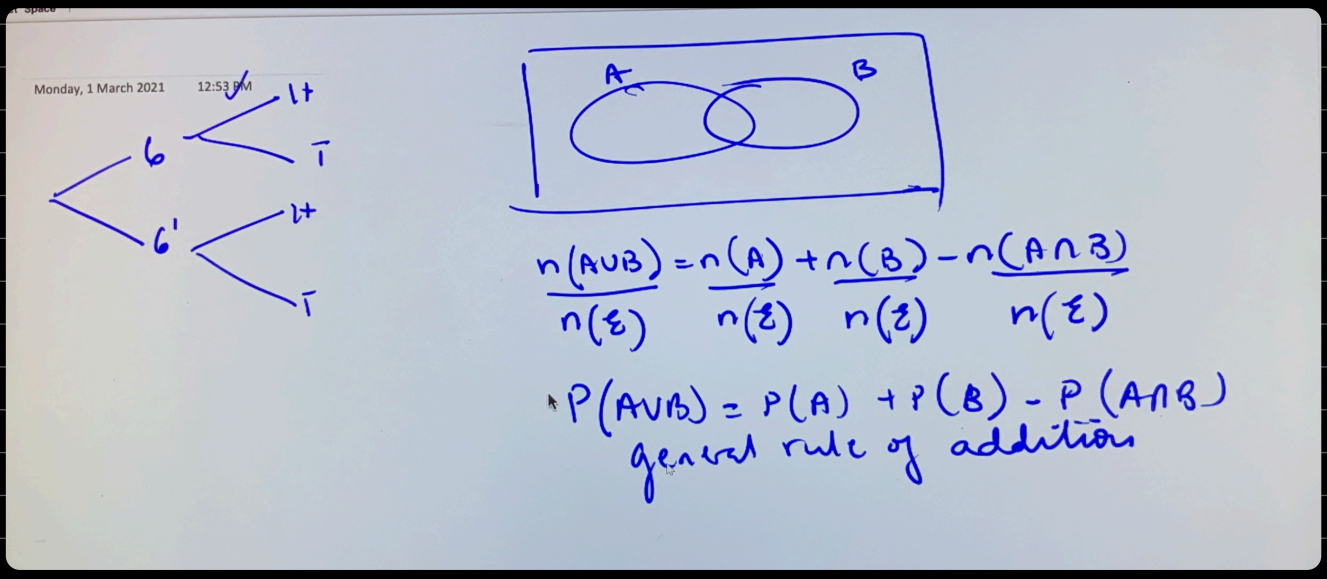
$0.05 \neq 0.2 \times 0.1$
$0.05 \neq 0.02$ → this implies that A and B are not independent

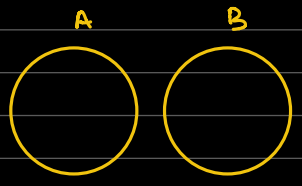
Example 2 :

$p(\text{Heart}) = \frac{13}{52}$ $p(A) = \frac{4}{52}$

$p(A \cap H) = \frac{1}{52}$

$\frac{1}{52} = \frac{13}{52} \times \frac{4}{52}$ → hence the two given events are independent





mutually exclusive events,
both can't happen simultaneously

↳ events are dependent

Example of mutually exclusive events is that if a coin has already been flipped to heads, the chance of it being a tail simultaneously is 0.

Questions from GC ws.

4.i) $p(G) = \frac{6}{16}$

ii) $\frac{1}{3}\left(\frac{2}{7} + \frac{3}{7} + \frac{1}{2}\right)$

$= \frac{1}{3}\left(\frac{4}{14} + \frac{6}{14} + \frac{7}{14}\right)$

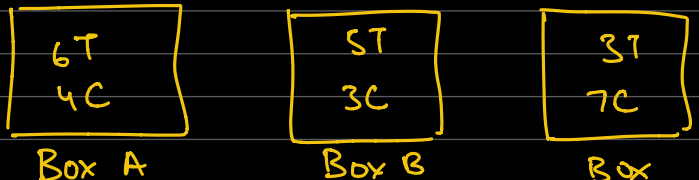
$= \frac{1}{3}\left(\frac{17}{14}\right)$

$= \frac{17}{42}$

iii) $p(P/G) = \frac{p(P \cap G)}{p(G)}$

$= \frac{\frac{1}{3} \times \frac{2}{7} + \frac{1}{3} \times \frac{3}{7}}{\frac{17}{42}}$

9.



i) $\left(\frac{1}{3} \times \frac{6}{10} \times \frac{5}{9}\right) + \left(\frac{1}{3} \times \frac{5}{8} \times \frac{4}{7}\right) + \left(\frac{1}{3} \times \frac{3}{10} \times \frac{2}{9}\right)$

$= \frac{30}{270} + \frac{20}{168} + \frac{6}{270}$

$= \quad + \frac{2}{90}$

MATH NOTES DURING NPTC CAMP

Attempt probability qs. done in class.

Learn what

0	1	2	3
1			
2			
3			

is and how to use it