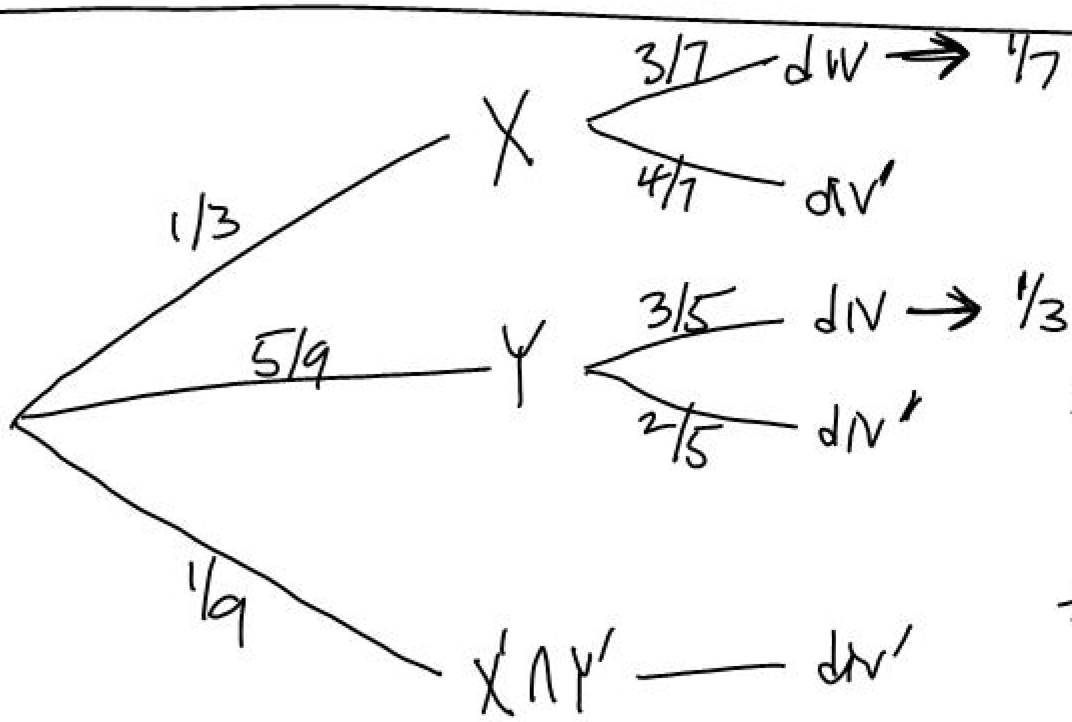
(a) $\binom{12}{3} = \dfrac{12!}{3!\,9!} = \dfrac{\overset{2}{\cancel{12}} \cdot 11 \cdot 10 \cdot \cancel{9!}}{\cancel{3 \cdot 2}\ \cancel{9!}}$

$= 220$

(b) $1 - P(\text{Agatha + Jacob on comm})$

$$1 - \frac{\binom{10}{1}}{\binom{12}{3}} = 1 - \frac{10}{220} = \frac{210}{220} = \frac{21}{22}$$

(c) $$\left.\begin{aligned} P(3G) &= \frac{\binom{5}{3}}{\binom{12}{3}} = \frac{10}{220} \\ P(2G, 1B) &= \frac{\binom{5}{2}\binom{7}{1}}{\binom{12}{3}} = \frac{70}{220} \end{aligned}\right\} \frac{80}{220} = \frac{4}{11}$$

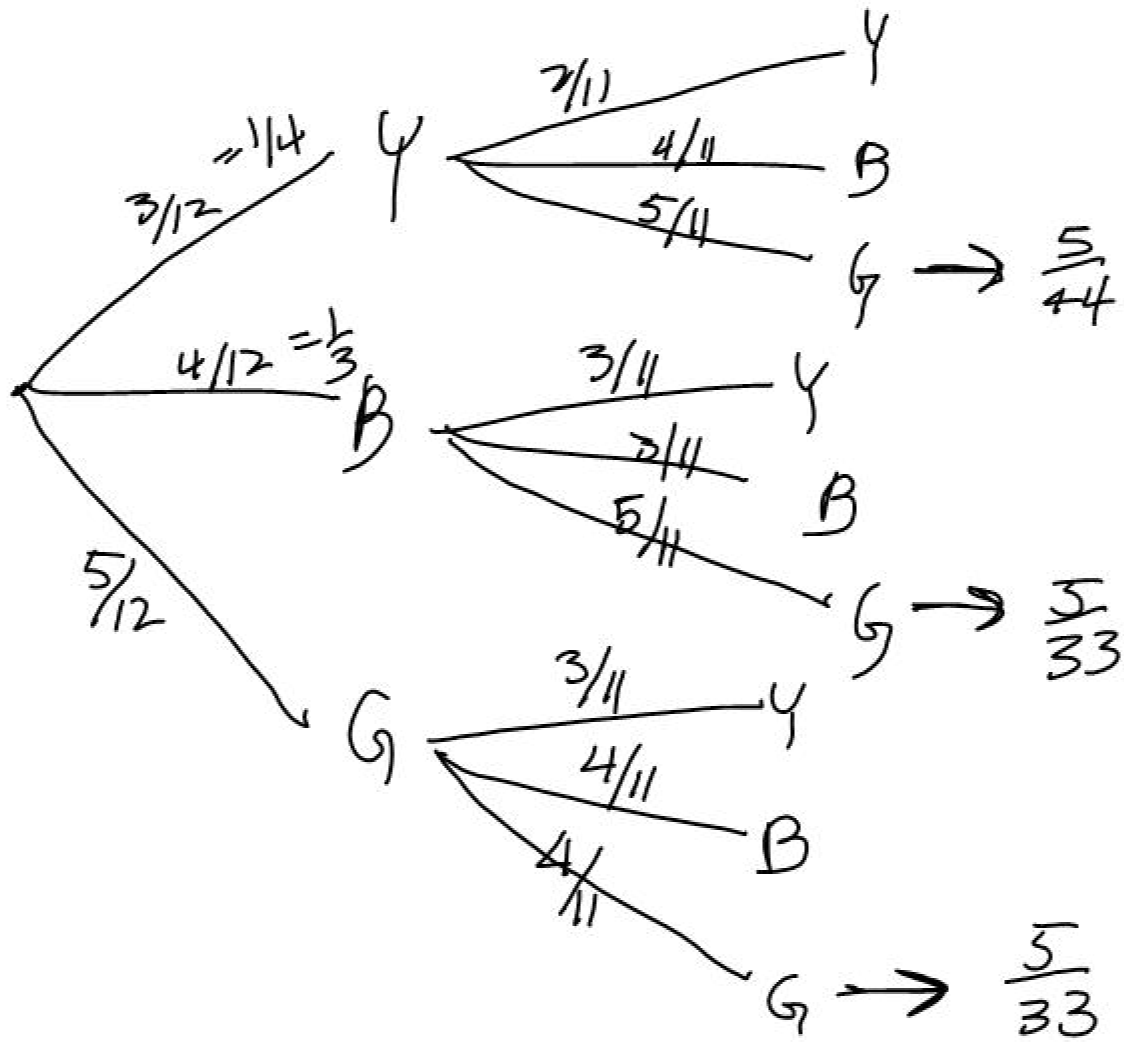


$P(\text{div}) = \dfrac{10}{21}$

$P(Y \mid \text{div})$

$= \dfrac{P(Y \cap \text{div})}{P(\text{div})}$

$= \dfrac{1/\cancel{3}}{10/\cancel{21}\,7} = \dfrac{7}{10}$



$$P(2^{nd}\text{ green}) = \frac{5}{44} + \frac{5}{33} + \frac{5}{33} = \frac{5}{12}$$

$$P(1^{st}\text{ green} \mid 2^{nd}\text{ green}) = \frac{P(1^{st}\text{ green} \cap 2^{nd}\text{ green})}{P(2^{nd}\text{ green})}$$

$$= \frac{\cancel{5}/33}{\cancel{5}/12} = \frac{12}{33} = \frac{4}{11}$$

	1	2	3	4	5	6
1	1	2	3	4	5	6
2	2	4	6	8	10	12
3	3	6	9	12	15	18
4	4	8	12	16	20	24
5	5	10	15	20	25	30
6	6	12	18	24	30	36

$$P(\text{div. by } 6 \mid \text{even}) = \frac{P(\text{div by } 6 \cap \text{even})}{P(\text{even})} = \frac{\cancel{15}^{5}/\cancel{36}_{9}}{\cancel{3}/\cancel{4}} = \frac{5}{9}$$

(*2) STATISTICS

$$\frac{10!}{3!\,3!\,2!} = 50400$$

(b) S _ _ _ _ _ _ _ _ _

$$\frac{\dfrac{9!}{2!\,3!\,2!}}{50400} = \frac{15120}{50400} = \frac{3}{10}$$

#3

(a) $\frac{10\cdot 10\cdot 5}{10\cdot 10\cdot 10} = \frac{1}{2}$

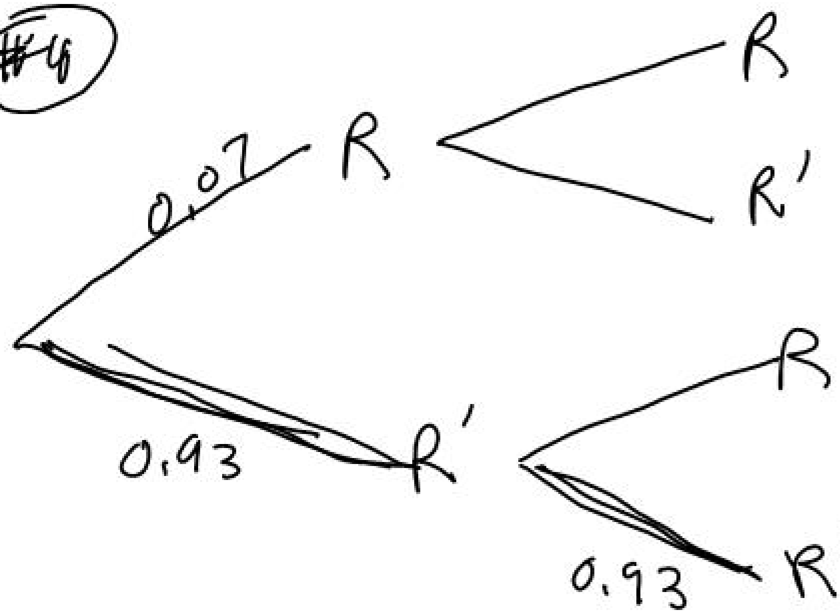
$$7\overline{)1000}\;\; 142$$

(b) $7(1), 7(2), 7(3), \dots, 7(142) \longrightarrow \frac{142}{1000}$

(c) $31^2 = 961$

$0^2, 1^2, 2^2, \dots, 31^2$ $\qquad \frac{32}{1000} = \frac{4}{125}$

#4



$\rightarrow$ 0.8649

$P(< 170) = 1 - 0.8649 = 0.1351$

#7 b)

How many times do you need to toss a coin to be 99% sure that you get at least 1 head?

$$1 - P(\text{no heads})$$

n tosses : $1 - \left(\frac{1}{2}\right)^n$

$$1 - \left(\frac{1}{2}\right)^7 = 0.992$$

$$\frac{6! \cdot 14!}{20!}$$

#9

$$\frac{\dfrac{14!}{\cancel{7!}\,\cancel{4!}\,\cancel{3!}}}{\dfrac{20!}{6!\,\cancel{7!}\,\cancel{4!}\,\cancel{3!}}} = \frac{1}{38760}$$

(b)

$$\frac{\dfrac{14!}{6!\,4!\,3!}}{\dfrac{20!}{6!\,7!\,4!\,3!}} = \frac{7}{38760}$$