Review Multiplication Rule, Independence

$P(A \& B) = P(A)\,P(B|A)$

If A and B are independent, then $P(A \& B) = P(A)\,P(B)$

$P(B|A) = P(B)$ and $P(A|B) = P(A)$.

4.165) $P(B) = 0.8 \neq P(B|A) = 0.6$ dependent events

4.169) $P(B) = 0.3$ $P(A|B) = 0.3$

Not enough information to determine independence.

$P(A \& B) = P(A)\,P(B)$
$P(B|A) = P(B)$
$P(A|B) = P(A)$

4.174) $P(A) = \frac{2}{5}$ $P(B) = \frac{3}{4}$ $P(A \& B) = \frac{3}{10}$

$P(A)P(B) = \left(\frac{2}{5}\right)\left(\frac{3}{4}\right) = \frac{3}{10} = P(A \& B)$

Independent events.

16% of Americans have addiction, 90% of them recieve no treatment.

Find prob. that American has addiction and recieves no treatment.

A = event that American has addiction

T = event that an individual receive No treatment

$P(A) = 0.16$ $P(T|A) = 0.9$

$P(A \& T) = P(A)\,P(T|A) = 0.16 \times 0.9 = 0.144$

14.4% of Americans have addiction and receive no treatment

4.179) HHH HTH THH TTH HHT HTT TH T TTT

$P(A) = \frac{1}{2}$ $P(B) = \frac{1}{2}$ $P(C) = \frac{3}{8}$

A = event toss #1 is H

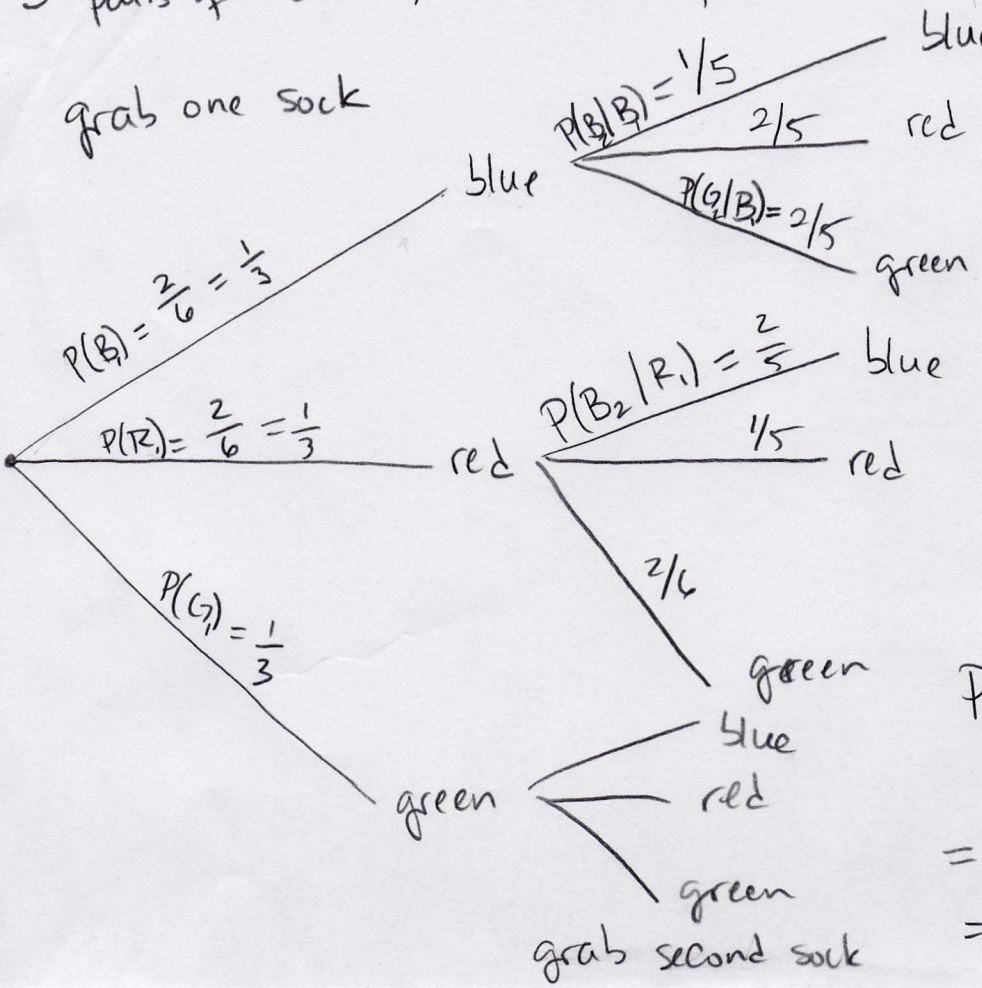
B = event toss #3 is T

C = event total heads is 1

$P(B|A) = \frac{2}{4} = \frac{1}{2} = P(B)$

independent

3 pairs of socks, unfolded/unpaired → red, blue, green



$P(B_1 \& B_2) = \frac{1}{3} \times \frac{1}{5} = \frac{1}{15}$

$P(B_1 \& R_2) = \frac{1}{3} \times \frac{2}{5} = \frac{2}{15}$

$P(\text{match}) = P(B_1 \& B_2 \text{ or } R_1 \& R_2 \text{ or } G_1 \& G_2)$

$P(B_1 \& B_2) + P(R_1 \& R_2) + P(G_1 \& G_2)$

$= \frac{1}{3} \times \frac{1}{5} + \frac{1}{3} \times \frac{1}{5} + \frac{1}{3} \times \frac{1}{5}$

$= \frac{3}{15}$