46. A = over 6 ft in height
B = professional basketball player
$P(A \mid B) > P(B \mid A)$

A+

As the over 6 ft in height male is more than professional basketball player in the world and the professional basketball player is normally very high.

50. a) $P(M \cap Ls \cap Pr) = 0.05$

b) $P(M \cap Pr) = 0.07 + 0.05 = 0.12$

c) $P(Ss) = 0.04 + 0.02 + 0.05 + 0.08 + 0.07 + 0.12 + 0.03 + 0.07 + 0.08 = 0.56$

$P(Ls) = 0.03 + 0.02 + 0.03 + 0.10 + 0.05 + 0.07 + 0.04 + 0.02 + 0.08 = 0.44$

d) $P(M) = 0.08 + 0.07 + 0.12 + 0.10 + 0.05 + 0.07 = 0.49$

$P(Pr) = 0.02 + 0.07 + 0.07 + 0.02 + 0.05 + 0.02 = 0.25$

e) $P(M \mid Ss) = \frac{M \cap Ss}{Ss} = \frac{0.08 + 0.07 + 0.12}{0.56} = \frac{0.27}{0.56} = \frac{27}{56}$

f) $P(Ss \mid M \cap Pl) = \frac{Ss \cap (M \cap Pl)}{M \cap Pl} = \frac{0.08}{0.08 + 0.10} = \frac{0.08}{0.18} = \frac{4}{9}$

$P(Ls \mid M \cap Pl) = 1 - \frac{4}{9} = \frac{5}{9}$

58. $P(A \cup B \mid C) = P(A \mid C) + P(B \mid C) - P(A \cap B \mid C)$

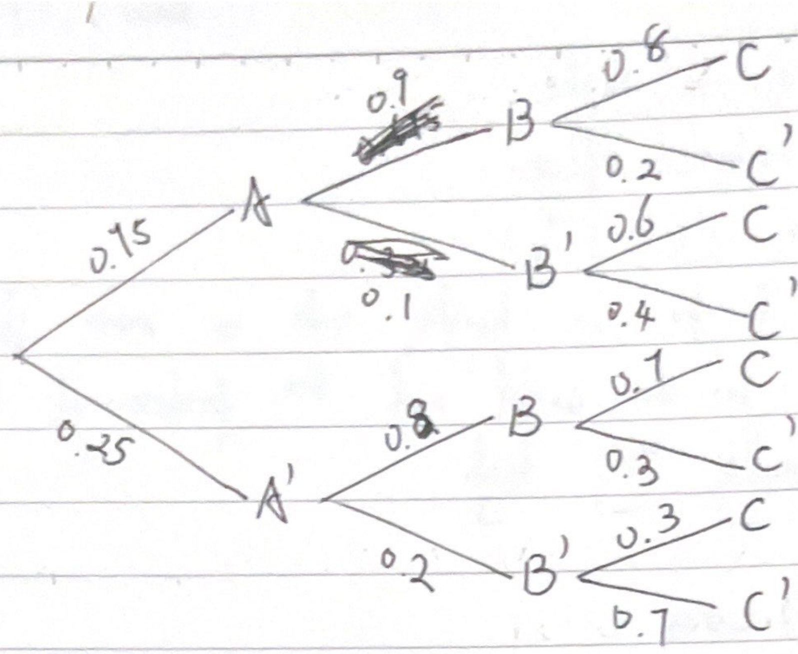
$$\frac{P((A \cup B) \cap C)}{P(C)} = \frac{P(A \cap C)}{P(C)} + \frac{P(B \cap C)}{P(C)} - \frac{P((A \cap B) \cap C)}{P(C)}$$

$$P((A \cup B) \cap C) = P(A \cap C) + P(B \cap C) - P((A \cap B) \cap C)$$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

Date. / /

63. a)



b) $P(A \cap B \cap C) = 0.75 \times 0.9 \times 0.8 = 0.54$

c) $P(B \cap C) = 0.54 + 0.25 \times 0.8 \times 0.7 = 0.54 + 0.14 = 0.68$

d) $P(C) = 0.68 + 0.75 \times 0.1 \times 0.6 + 0.25 \times 0.2 \times 0.3 = 0.68 + 0.045 + 0.015$

$= 0.74$

e) $P(A \mid B \cap C) = \dfrac{P(A \cap (B \cap C))}{P(B \cap C)} = \dfrac{0.54}{0.68} = \dfrac{27}{34}$

B

~~71. a)~~ $\cancel{P(B' | A') = \frac{P(B' \cap A')}{P(A')} = \frac{0.3 \times 0.6}{0.6} =}$

71. a) $P(A' \cap B')$

Since they are independent

$P(A' \cap B') = 0.6 \times 0.3 = 0.18$

b) $P((A \cap B') \cup (A' \cap B) \cup (A \cap B)) = P(A \cup B) = P(A) + P(B) - P(A \cap B)$

Since they are independent

$P(A) + P(B) - P(A \cap B) = 0.4 + 0.7 - 0.4 \times 0.7 = 1.1 - 0.28 = 0.82$

c) $P(A \cap B')$

Since they are independent

$P(A \cap B') = 0.4 \times 0.3 = 0.12$

72. if A_i independent of A_j, $P(A_i)P(A_j) = P(A_i \cap A_j)$

$P(A_1)P(A_2) = P(A_1 \cap A_2)$

$0.22 \times 0.25 = 0.11$

$0.055 \neq 0.11$

$P(A_2)P(A_3) = P(A_2 \cap A_3)$

$0.25 \times 0.28 = 0.07$

$0.07 = 0.07$

$P(A_1)P(A_3) = P(A_1 \cap A_3)$

$0.22 \times 0.28 = 0.05$

$0.0616 \neq 0.05$

A_2 and A_3 are independent

80. $P(\text{system works}) = P((1 \cup 2) \cup (3 \cap 4))$ ~~[illegible]~~

$$= P(1) + P(2) - P(1 \cap 2) + P(3 \cap 4) - (P(1) + P(2) - P(1 \cap 2)) \cap P(3 \cap 4)$$

since they are ~~m~~ independent

$$P(\text{system works}) = 0.9 + 0.9 - 0.9^2 + 0.9^2 - ((0.9 + 0.9 - 0.9^2) \times 0.9^2)$$

$$= 0.99 + 0.81 - 0.99 \times 0.81 = 1.8 - 0.8019 = 0.9091$$

Date. / /

84. a) $P(\text{all three pass}) = 0.7^3 = 0.343$

b) $P(\text{at least 1 fail}) = 1 - P(\text{all three pass}) = 1 - 0.343 = 0.657$

c) $P(\text{exactly 1 fail}) = P((F \cap P \cap P) \cup (P \cap F \cap P) \cup (P \cap P \cap F))$

$= 0.3 \times 0.7^3 \times 3 = 0.441$

d) $P(\text{at most 1 pass}) = 0.3^3 + 0.7 \times 0.3^2 \times 3 = 0.027 + 0.189 = 0.216$

e) $P(\text{all three pass} \mid \text{at least 1 pass}) = \frac{0.343}{0.189 + 0.343} = \frac{0.343}{0.532} = 0.6447\ldots$

4. X = 2 Two non-zero number and three zeros
example : 12000
X = 3 Three non-zero number and two zeros
example : 12300
X = 4 Four non-zero number and one zero
example : 12340

5. No, for example a coin repeatedly until the first times a heads appears. The sample is infinite. Define rv X that takes the value 1 if a heads appears on the first and 2 on the second and so on. X will take values 1, 2, 3, ... the number of flips needed for first heads. This is a finite set of possible values.

8. 1. SSS (Y=3) Get 3 successes on first three trials
2. FSSS (Y=4) One fail and 3 successes
3. FFSSS (Y=5) 2 fail and 3 successes
4. FFFSSS (Y=6) 3 fail and 3 successes
5. FFFFSSS (Y=7) 4 fail and 3 successes

10. a) $T = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
b) $X = \{-2, -1, 0, 1, 2, 3, 4, 5, 6\}$
c) $U = \{0, 1, 2, 3, 4, 5, 6\}$
d) $Z = \{0, 1, 2\}$

12. a) $P(X = 55) = 0.01$

b) $P(X < 55) = 0.01 + 0.02 = 0.03$

c) $P(\text{first person}) = 1 - 0.05 = 0.95$

$P(\text{third person}) = 1 - 0.05 - 0.10 - 0.12 = 0.73$

23. a) $P(X = 2) = 0.39 - 0.19 = 0.2$

b) $P(X > 3) = 1 - 0.39 = 0.61$

c) $P(2 \leq X \leq 5) = 0.92 - 0.06 = 0.86$

d) $P(2 < X < 5) = 0.92 - 0.19 = 0.73$

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