A+

2.4 46.50.58.63

2.5 71.72.80.84

3.1 4.5.8.10

3.2 12.23.25

46. $P(A|B) = \frac{P(A\cap B)}{P(B)}$

$P(B|A) = \frac{P(A\cap B)}{P(A)}$

Based on common sense, $P(B) < P(A)$

Therefore, $P(A|B) > P(B|A)$

50. a. Let the probability be $P(A)$

$P(A) = 0.05$

b. Let the probability be $P(B)$

$P(B) = 0.05 + 0.07 = 0.12$

c. the probability of a long-sleeved shirt $= P(C) = 0.03 + 0.02 + 0.03 + 0.10 + 0.05 + 0.07 + 0.04 + 0.02 + 0.08 = 0.44$

the probability of a short-sleeved shirt $= P(D) = 0.04 + 0.02 + 0.05 + 0.08 + 0.07 + 0.12 + 0.03 + 0.07 + 0.08 = 0.56$

d. the probability of the shirt is medium $= P(E) = 0.08 + 0.07 + 0.12 + 0.10 + 0.05 + 0.07 = 0.5$

the Probability of the pattern is a print $= P(F)$

$P_1 = P(F|E) = \frac{P(F\cap E)}{P(E)} = \frac{0.12}{0.5} = 0.24$

e. $P_2 = \frac{0.08}{0.04+0.08+0.03} = \frac{8}{15}$

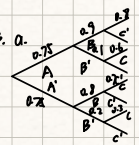
f. $P(\text{short}) = \frac{0.08}{0.08+0.10} = \frac{4}{9}$

$P(\text{long}) = \frac{0.10}{0.08+0.10} = \frac{5}{9}$

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

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

63. a.



b. $P(A\cap B\cap C) = 0.75\times0.9\times0.8 = 0.54$

c. $P(B\cap C) = P(A\cap B\cap C) + P(A'\cap B\cap C) = 0.54 + 0.25\times0.8\times0.7 = 0.68$.

d. $P(C) = P(A\cap B\cap C) + P(A'\cap B\cap C) + P(A\cap B'\cap C') + P(A'\cap B'\cap C')$

$= 0.54 + 0.045 + 0.14 + 0.015 = 0.74$

e. $P(A|B\cap C) = \frac{P(A\cap B\cap C)}{P(B\cap C)} = \frac{0.54}{0.68} = 0.7941$

71. a. Since A and B are independent, then A' and B' are independent too.

$P(B'|A') = P(B') = 1 - 0.7 = 0.3$

b. Using the addition rule, $P(A\cup B) = P(A) + P(B) - P(A\cap B) = 0.4 + 0.7 - (0.4\times0.7) = 0.82$.

c. $P(A\cap B'|A\cup B) = \frac{P((A\cap B')\cap(A\cup B))}{P(A\cup B)} = \frac{P(A\cap B')}{P(A\cup B)} = \frac{0.4\times(1-0.7)}{0.82} = 0.146$

72. $P(A_1\cap A_2) = 0.11$, $P(A_1)\cdot P(A_2) = 0.55$. so they are not Independent.

$P(A_1\cap A_3) = 0.05$, $P(A_1)\cdot P(A_3) = 0.0616$. so they are not independent.

$P(A_2\cap A_3) = 0.07$, $P(A_2)\cdot P(A_3) = 0.07$, so they are Independent.

80. $P(\text{system works}) = P((A_1\cup A_2)\cup(A_3\cap A_4)) = P(A_1\cup A_2) + P(A_3\cup A_4) - P((A_1\cup A_2)\cap(A_3\cap A_4))$

$= P(A_1) + P(A_2) - P(A_1\cap A_2) + P(A_3) + P(A_4) - P(A_1\cup A_2)\times P(A_3\cap A_4)$

$= 0.99 + 0.81 - (0.99\times0.81) = 0.9981$

84. Let A_i denote the event $(i = 1,2,3)$

a. $P(A_1\cap A_2\cap A_3) = P(A_1)\cdot P(A_2)\cdot P(A_3) = 0.7\times0.7\times0.7 = 0.343$

b. $P(\acute{A_1}\cap A_2\cap A_3) = 1 - 0.343 = 0.657$

c. $P((A_1\cap A_2'\cap A_3')\cup(A_1'\cap A_2\cap A_3')\cup(A_1'\cap A_2'\cap A_3)) = 0.7\times0.3\times0.3 + 0.3\times0.7\times0.3 + 0.3\times0.3\times0.7$

$= 0.189$

d. $P(A_1'\cap A_2'\cap A_3') + 0.189 = 0.027 + 0.189 = 0.216$

e. $P(A_1\cap A_2\cap A_3|A_1\cup A_2\cup A_3) = \frac{P((A_1\cap A_2\cap A_3)\cap(A_1\cup A_2\cup A_3))}{P(A_1\cup A_2\cup A_3)}$

$= \frac{P(A_1\cap A_2\cap A_3)}{P(A_1\cup A_2\cup A_3)} = \frac{0.343}{0.973} = 0.3525$

4. Zip code : 10000 $X=1$

20345 $X=4$

00000 $X=0$

5. No. Make the sample space of A equal to all integers.

If the number is even, $X = 1$

" " " odd, $X = 0$.

The random varible has only two values.

8. $Y = 3, 4, 5, 6, \cdots$

$Y=3$ SSS $Y=4$ FSSS $Y=5$ FFSSS SFSSS

$Y=6$ SSFSSS, FSFSSS, FFFSSS, SFFSSS

$Y=7$ FFFFSSS. FFSFSSS FSFFSSS FSSFSSS SFFFSSS.

SFSFSSS, SSFFSSS

A

10. a. $T = 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10$

b. $X = -4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6$

c. $U = 0, 1, 2, 3, 4, 5, 6$

d. $Z = 0, 1, 2$

12. a. $P(Y\le 50) = 0.05 + 0.10 + 0.12 + 0.14 + 0.25 + 0.17 = 0.83$

b. $P(Y>50) = 1 - 0.83 = 0.17$

c. $P(Y\le 49) = 0.05 + 0.10 + 0.12 + 0.14 + 0.25 = 0.66$

$P(Y\le 47) = 0.05 + 0.10 + 0.12 = 0.27$

23. a. $P(2) = F(3) - F(2) = 0.39 - 0.19 = 0.20$

b. $P(X>3) = 1 - F(3) = 1 - 0.67 = 0.33$

c. $P(2\le X\le 5) = F(5) - F(1) = 0.92 - 0.19 = 0.78$

d. $P(2<X<5) = F(4) - F(2) = 0.92 - 0.39 = 0.53$

25. $P(0) = P(B \text{ first}) = p$;

$P(1) = P(Y=1) = P(G \text{ first}, \text{then } B) = (1-p)p$;

$P(2) = P(GGB) = (1-p)^2 p$

Continuing, $P(y) = (1-p)^y p$ for $y = 0, 1, 2, 3, \cdots$