

Section 2.5

(71). a. A' and B' are independent so $P(B'/A') = P(B') = 1 - 0.7 = 0.3$

b. $P(A \cup B) = P(A) + P(B) - P(A \cap B) = 0.4 + 0.7 - (0.4 \times 0.7) = 0.82$

c. $P(A \cap B' / A \cup B) = \frac{P(A \cap B' \cap (A \cup B))}{P(A \cup B)} = \frac{P(A \cap B')}{P(A \cup B)} = \frac{(0.4)(0.3)}{0.82} = 0.146$

(72) $P(A_1 \cap A_2) = 0.11$ $P(A_1)P(A_2) = 0.055$ so A_1 and A_2 are not independent

$P(A_1 \cap A_3) = 0.05$ $P(A_1)P(A_3) = 0.0616$ so A_1 and A_3 are not independent

$P(A_2 \cap A_3) = 0.07$ $P(A_2)P(A_3) = 0.07$ so A_2 and A_3 are independent

80. The events A_1, A_2, A_3, A_4 be that the components 1, 2, 3, 4 works.

so the system works if $(A_1 \cup A_2) \cap (A_3 \cap A_4)$

$$P(A_1 \cup A_2) = P(A_1) + P(A_2) - P(A_1 \cap A_2) = 0.9 + 0.4 - (0.9)(0.9) = 0.49$$

$$P(A_3 \cap A_4) = (0.9)(0.9) = 0.81$$

$$P((A_1 \cup A_2) \cap (A_3 \cap A_4)) = P(A_1 \cup A_2) \cdot P(A_3 \cap A_4) = 0.49 \cdot 0.81 = 0.3969$$



(84) a. $P(A_1 \cap A_2 \cap A_3) = P(A_1) \times P(A_2) \times P(A_3) = 0.7 \times 0.7 \times 0.7 = 0.343$

b. $P = 1 - 0.343 = 0.657$

c. $P[(A_1 \cap A_2' \cap A_3') \cup (A_1' \cap A_2 \cap A_3') \cup (A_1' \cap A_2' \cap A_3)]$
 $= (0.7)(0.3)(0.3) + (0.3)(0.7)(0.3) + (0.3)(0.3)(0.7)$
 $= 0.189$

d. $P = P(\text{zero}) + P(\text{one pass}) = P(A_1' \cap A_2' \cap A_3') + 0.189$
 $= (0.3)(0.3)(0.3) + 0.189$
 $= 0.27 + 0.189 = 0.459$

e. $P(\text{at least one}) = 1 - P(\text{zero}) = 1 - 0.27 = 0.73$

$P(A_1 \cap A_2 \cap A_3 | \text{at least one}) = \frac{0.343}{0.73} = 0.47$

Section 3.1

(4) $X = 2, 3, 4, 5$ $X=5 \rightarrow 16329$

$X=4 \rightarrow 34240$

$X=3 \rightarrow 76300$

(5) N_0



(10) $Y = 3, 4, 5, 6, 7$
 $Y=3: SSS$ $Y=4: FSSS$ $Y=5: FFSSS, SFS SS$
 $Y=6: SSFSSS, SFFSSS, FSSFSSS, FFFFSSS$
 $Y=7: SSSFSSS, SFSFSSS, SFFSFSSS, FSSFSSS, FSSFSSS,$
 $FFFFSSS$

(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. $Z: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10$

Section 3.2

a. $P(Y \leq 50) = 0.05 + 0.1 + 0.12 + 0.14 + 0.25 + 0.17 = 0.83$

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

c. $P(Y \geq 40) = 0.05 + 0.1 + 0.12 + 0.14 + 0.75 = 0.66$

$P(Y \leq 47) = 0.05 + 0.1 + 0.12 = 0.27$



$$(23) \quad a. \quad P(X=2) = F(3) - F(2) = 0.39 - 0.14 = 0.2$$

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

$$c. \quad P(2 \leq X \leq 5) = F(5) - F(2-1) = 0.92 - 0.14 = 0.78$$

$$d. \quad P(2 < X < 5) = P(2 \leq X \leq 4) = F(4) - F(2) = 0.42 - 0.39 = 0.03$$

$$(25) \quad p(0) = P(Y=0) = P(B \text{ first}) = p$$

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

$$p(2) = P(Y=2) = P(GG B) = (1-p)^2 p$$

$$p(y) = P(y \text{ Gs and then a B}) = (1-p)^y p$$

