UPDF
WWW.UPDF.CN

Assignments for fourth week

Finish the homework:

Section 2.5 71, 72, 80, 84

Section 3.1 4, 5, 8, 10

Section 3.2 12, 23, 25

B+

2.5

71. a. $P(\bar{B}) = 1 - P(B) = 0.3$

b. Let C be the event that at least one of the two projects will be successful

$$P(C) = P(A)\cdot P(\bar{B}) + P(\bar{A})\cdot P(B) + P(A)\cdot P(B)$$
$$= 0.4\times 0.3 + 0.6\times 0.7 + 0.4\times 0.7$$
$$= 0.82$$

c. Let D be the event that only the Asian project is successful.

$$P(D) = P(A)\cdot P(\bar{B}) = 0.12$$

$$P(D/C) = \frac{P(D\cap C)}{P(C)} = \frac{P(D)}{P(C)} \approx 0.146$$

72.

13. A computer consulting firm presently has bids out on three projects. Let $A_i = \{\text{awarded project } i\}$, for $i = 1, 2, 3$, and suppose that $P(A_1) = .22$, $P(A_2) = .25$, $P(A_3) = .28$,

UPDF
WWW.UPDF.CN

13. A computer consulting firm presently has bids out on three projects. Let $A_i = \{\text{awarded project } i\}$, for $i = 1, 2, 3$, and suppose that $P(A_1) = .22$, $P(A_2) = .25$, $P(A_3) = .28$, $P(A_1 \cap A_2) = .11$, $P(A_1 \cap A_3) = .05$, $P(A_2 \cap A_3) = .07$, $P(A_1 \cap A_2 \cap A_3) = .01$. Express in words each of the following events, and compute the probability of each event:

a. $A_1 \cup A_2$
b. $A_1' \cap A_2'$ [*Hint:* $(A_1 \cup A_2)' = A_1' \cap A_2'$]
c. $A_1 \cup A_2 \cup A_3$
d. $A_1' \cap A_2' \cap A_3'$
e. $A_1' \cap A_2' \cap A_3$
f. $(A_1' \cap A_2') \cup A_3$

Sol: A_1 and A_2

$P(A_1) \cdot P(A_2) = 0.22 \times 0.25 = 0.055 \neq P(A_1 \cap A_2)$

So A_1 and A_2 are not independent.

A_1 and A_3

$P(A_1) \cdot P(A_3) = 0.22 \times 0.28 = 0.0616 \neq P(A_1 \cap A_3)$

So A_1 and A_3 are not independent

A_2 and A_3

$P(A_2) \cdot P(A_3) = 0.28 \times 0.25 = 0.07 = P(A_2 \cap A_3)$

So A_2 and A_3 are independent.

⇒ 1, 2, 3, 4

80. Let $N\ (=A, B, C, D)$ be the event that the components works.

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

$= P(A) + P(B) - P(A) \cdot P(B)$

$= 0.99$

$P(C \cap D) = P(C) \cdot P(D) = 0.81$

$P(\text{system works}) = P(A \cup B) \cdot P(C \cap D)$

$+ P(\overline{A \cup B}) \cdot P(C \cap D) + P(A \cup B) \cdot P(\overline{C \cap D})$

$= 0.9981$

UPDF
WWW.UPDF.CN

$= 0.9981$

84. a. P(all of the next three vehicles inspected pass)

$= 0.7 \times 0.7 \times 0.7$

$= 0.343$

b. P(at least one of the next three inspected fails)

$= 0.3 \times 0.7 \times 0.7 \times 3 + 0.3 \times 0.3 \times 0.7 \times 3$

$+ 0.3 \times 0.3 \times 0.3$

$= 0.657$

c. P(exactly one of the next three inspected passes)

$= 0.7 \times 0.3 \times 0.3 \times 3$

$= 0.189$

d. P(at most one of the next three inspected passes)

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

$= 0.216$

e. Let A be the event that all of the next three vehicles pass, B be the event that at least one of the next three passes.

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

$$= \frac{0.343}{0.657}$$

$$\approx 0.522$$

UPDF
WWW.UPDF.CN

3.1.
4. $S(x) = (000000, 00000x \cdots \cdots xxxxxx)$

Three posible outcomes:

644300 $X_1 = 4$

121000 $X_2 = 3$

000000 $X_3 = 0$

5. No, for example, think about a random experiment. It's sample space is constant $S = \{1, 2, 3 \cdots\}$ We define a rv X if the number selected is prime number. The set of possible values of X $\{1, 0\}$

8. Sol. SSS $Y=3$

FSSS $Y=4$

FFSSS $Y=5$

SFSSS $Y=5$

FFFSSS $Y=6$

SFFSSS $Y=6$

SSFSSS $Y=6$

FSFSSS $Y=6$

FFFFSSS $Y=7$

SFFFSSS $Y=7$

FSFFSSS $Y=7$

FFSFSSS $Y=7$

SSFFSSS $Y=7$

SFSFSSS $Y=7$

FSSFSSS $Y=7$

UPDF
WWW.UPDF.CN

FSSFSSS $Y=7$

10. Sol: a. $T=\{0,1,2,3,4,5,6,7,8,9,10\}$

b. $X=\{0,1,2,3,4,5,6\}$

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

d. $U=\{0,1,2\}$

3.2

12.a. Let A be event that the flight will accommodate all ticketed passengers who show up.

$P(A)=0.05+0.10+0.12+0.14+0.25+0.17$

$=0.83$

b. Let B be event that not all the flight will accommodate all ticketed passengers who show up.

$P(B)=1-P(A)=0.17$

c. $P(\text{first})=0.05+0.10+0.12+0.14+0.25$

$=0.66$

$P(\text{third})=0.05+0.10+0.12$

$=0.27$

23.

UPDF
WWW.UPDF.CN

$+0.25$

$= 0.66$

$p(\text{third}) = 0.05 + 0.10 + 0.12$

$= 0.27$

23.

a. $p(2) = 0.39$

b. $p(X>3) = 1 - 0.39$

$= 0.61$

c. $p(2 \leq X \leq 5) = 0.97 - 0.19$

$= 0.78$

d. $p(2 < X \leq 5) = 0.92 - 0.39$

$= 0.53$

25. pmf of Y

Y	0	1	2	..	n
p(y)	p	$(1-p)p$	$(1-p)^2 p$	..	$(1-p)^n p$