2\. $P(A' \cap B' \mid A') = \dfrac{(1-0.4)\cdot(1-0.7)}{1-0.4} = \dfrac{0.6\cdot 0.3}{0.6} = 0.3$

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

c. $P(A \cap B' \mid A \cup B) = \dfrac{A - A \cap B}{A \cup B} = \dfrac{0.12}{0.82} = 0.146$

72\. $A_2$ and $A_3$ are independent.

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

$P(A_2 \cap A_3) = 0.07$

80\. $P(\text{system works}) = (P(1 \vee 2) \cup (P(3 \wedge 4))$

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

$= 0.99 + 0.81 - 0.99 \times 0.81$

$= 0.9981$

A

84\. a. $0.7 \times 0.7 \times 0.7 = 0.343$

b. $1 - 0.343 = 0.657$

c. $3 \times 0.7 \times 0.3 \times 0.3 = 0.189$

d. $0.3 \times 0.3 \times 0.3 = 0.027$

$0.027 + 0.189 = 0.216$

e. $P(\text{all three pass} \mid \text{at least one pass})$

$= \dfrac{0.343}{1 - 0.027}$

$= \dfrac{0.343}{0.973}$

$= 0.353$

3.1 . 4. Possible values of $x$ : 1, 2, 3, 4, 5

Three zip code examples : 22313, 10002, 20241

$x(22313) = 5 \quad x(10002) = 2 \quad x(20241) = 4$

5\. No. Let $S$ be set of natural number $N$, define random variable $x$ as

$X = 0$ if the chosen number from $N$ include 1 or 3 or 5;

$X = 1$ otherwise.

$x$ has only two values, however the sample space is infinite.

8\. $Y = 3$ : SSS

$Y = 4$ : FSSS

$Y = 5$ : FFSSS, SFSSS

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

$Y = 7$ : FFFFSSS, SFFFSSS, FSFFSSS, FFSFSSS, SSFFSSS, FSSFSSS,

SFSFSSS

10\. a. $4 + 6 = 10$

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

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

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

d. $Z = 0, 1, 2$

3.2. 12. a. $0.05 + 0.1 + 0.12 + 0.14 + 0.25 + 0.17 = 0.83$

b. $1 - 0.83 = 0.17$

c. $P(Y \le 49) = 0.05 + 0.1 + 0.12 + 0.14 + 0.25$
$= 0.66$

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

23 a. $P(X=2) = P(2 \le X < 3) - P(1 \le X < 2)$
$= 0.39 - 0.19$
$= 0.2$

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

c. $P(2 \le X \le 5) = 0.97 - 0.19 = 0.78$

d. $P(2 < X < 5) = P(3 \le X \le 4) = 0.92 - 0.39 = 0.53$

25. $P(Y=0) = P(B) = p$
$P(Y=1) = P(GB) = (1-p)p$
$P(Y=2) = P(GGB) = (1-p)^2 p$

$$P(Y=y) = \begin{cases} (1-p)^y p & y = 0, 1, 2, 3, \dots \\ 0 & \text{otherwise} \end{cases}$$