自测题一答案

一 选择填空题

1	2	3	4	5
C	B	A	C	C
6	**7**	**8**		
D	2	ln2		

三 计算题

1. $P(A|B) = P(A), P(\bar{A}|\bar{B}) = P(\bar{A})$,

$P(A|B) + P(\bar{A}|\bar{B}) = P(A) + P(\bar{A}) = 1$

$P(A|A\cup B) = P(A(A\cup B))/P(A\cup B) = P(A)/(P(A) + P(B))$

2. $p = 0.25 \times 0.2 + 0.75 \times 1 = 0.8$

$\dfrac{0.75 \times 1}{0.25 \times 0.2 + 0.75 \times 1} = \dfrac{15}{16} = 0.93$

3. $F_Y(x) = \begin{cases} 1 - (x+1)e^{-x}, & x > 0 \\ 0, & x \le 0 \end{cases}$

$E(Y) = \int_0^{+\infty} x^2 e^{-x} \mathrm{d}x = 2$

4. $P(X = n) = 0.8^{n-1} 0.2$, $n = 1, 2, \cdots$,

$P(X \ge k) = 0.8^{k-1}$

$E(X) = 5$

5. $D(X) = D(X - C) = E(X - C)^2 - E^2(X - C) \le E(X - C)^2$

$E(X) = \int_0^{+\infty} \dfrac{x}{\sqrt{2\pi x}} e^{-\frac{x}{2}} dx = 1$

6. $P\{Y \le 3/4\} = P\{X \le 3/4, 1 - X \le 3/4\} = P\left\{\dfrac{1}{4} \le X \le \dfrac{3}{4}\right\} = 1/2$

$F_Y(x) = \begin{cases} 0, & x < 1/2 \\ 2x - 1, & 1/2 \le x \le 1 \\ 1, & x > 1 \end{cases}$, $f_Y(x) = \begin{cases} 2, & 1/2 \le x \le 1 \\ 0, & else \end{cases}$

$E(Y) = \dfrac{3}{4}$, $D(X) = \dfrac{1}{48}$