第六次习题解答 by 许岷

- 7.解:

$$f(x) = \frac{1}{b-a}$$

$$h(y) = (\frac{6*y}{\pi})^{\frac{1}{3}}$$

$$h'(y) = (\frac{6}{\pi}) \times (\frac{6y}{\pi})^{\frac{-2}{3}}$$

$$f_Y(y) = f(y) \times |h'(y)| = (\frac{2}{\pi(b-a)}) \times (\frac{6y}{\pi})^{\frac{-2}{3}}$$

- 13.解: $y = \sin x$

$$h_1(y) = \arcsin y$$

$$h_1'(y) = \frac{1}{\sqrt{1-y^2}}$$

$$h_2(y) = \pi - \arcsin y$$

$$h_2'(y) = -\frac{1}{\sqrt{1-y^2}}$$

$$f_Y(y) = f(h_1(y)) \times |h_1'(y)| + f(h_2(y)) \times |h_2'(y)| = \frac{2}{\pi\sqrt{1-y^2}}$$

- 2.解: 第K次结束的概率:

$$p = (\frac{1}{5})^{k-1} \times \frac{4}{5}$$

$$E(x) = 1 \times \frac{4}{5} + 2 \times \frac{1}{5} \times \frac{4}{5} + ... + (\frac{1}{5})^{k-1} \times \frac{4}{5} + ...$$

$$E(x) = \frac{5}{4}$$

- 3.解: $X_i = \begin{cases} 1, & \text{for, 第i次试验中出现A} \\ 0, & \text{for, 第i次试验中不出现A} \end{cases}$

$$PX_i = 1 = p_i$$

$$EX_i = 1 \times PX_i = 1 + 0 = p_i$$

$$EX = E(X_1 + ... + X_n) = \sum p_i$$

- 6.解: (1)

$$PX = K = (k-1) \times (1-p)^{k-2} \times p^2$$

(2)

$$P(B) = \sum PX = 2m = \sum (2m-1) \times (1-p)^{2m-2} \times p^2 = \frac{2-2p+p^2}{(2-p)^2}$$

(3)

$$E(X) = \sum k \times PX = k = \sum k \times (k-1) \times (1-p)^{k-2} \times p^2 = p^2$$

$$E(X) = p^2 \times \frac{2}{[1-(1-p)]^3} = p^2 \times \frac{2}{p^3} = \frac{2}{p}$$

注意:

$$\sum (2m-1) \times x^{2m-2} = (\sum x^{2m-1})' = (x \sum x^{2(m-1)})' = (\frac{x}{1-x^2})' = \frac{1+x^2}{(1-x^2)^2}$$

- 9.解: $\sum |x_k| p_k = \sum \frac{1}{k}$ 发散，所以不存在。