Jinyang Li -A20317851-HW05

Problem 1 (5 points) Exercise 4.17 from Textbook

x	-3	6	9
f(x)	1/6	1/2	1/3

To find ug(X), g(X) = (2 X+ 1)^2

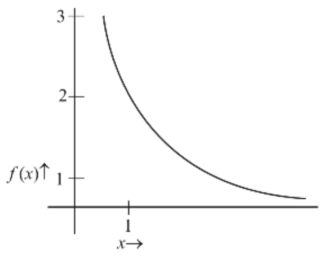
E[g(X)] = $\sum_{x=-3,6,9}^{\|} (2x+1)^2 \, f(x)$

= [1/6*(2(-3)+1)^2] + [1/2(2*6+1)^2] + [1/3(2*9 +1)^2]
= 209

Problem 2 (10 points: 5 pts/question) Exercise 4.29

f(x) = { 3 x ^(-4) , x > 1
0 ,elsewhere

a)



b) E(x) = $3\int_{1}^{\infty} xx^{-4}dx$

= 3/2

Problem 3 (5 points) Exercise 4.41 from Textbook

To find ug(X), g(X) = (2 X+ 1)^2

u[g(X)] = $\sum_{x=-3,6,9} (2x+1)^2 \, f(x)$

= [1/6*(2(-3)+1)^2] + [1/2(2*6+1)^2] + [1/3(2*9 +1)^2]
= 209

E[g(X)]^2 = $\Sigma\,(2x+1)^4 f(x)$

= 57825

$\sigma^2_{g(X)} = \mathrm{E}\,[g(X)]^2 - \{\mathrm{E}[g(X)]\}^2$

= 57825 - (209)^2
= 14144

Problem 4 (5 Points) Exercise 4.50 from Textbook

The mean of X

E (x) = $\int_0^1 x f(x) dx$

= 1/3

the value of E (X^2)

E(X^2) = $\int_0^1 x^2 f(x) dx$

= 1/6

Variance of the working of equipment

$\sigma^2 = Var(X) = \mathrm{E}(X^2) - [\mathrm{E}(X)]^2$ = 1/18

So the standard deviation of x is 0.2357

Problem 5 (5 points) Exercise 4.56 from Textbook

$$\mathrm{E}(X)=\int_{-\infty}^{\infty} xf(x)dx=\int_{0}^{1} xxdx+\int_{1}^{2} x(2-x)dx=1$$

$$\mathrm{E}(X^2)=\int_{-\infty}^{\infty} x^2 f(x)dx=\int_{0}^{1} x^2 xdx+\int_{1}^{2} x^2(2-x)dx=\frac{14}{12}$$

The mean of the random variable y = 60 x^2 + 39x

$$\mathrm{E}(Y)=\mathrm{E}(60X^2+39X)=60\mathrm{E}(X^2)+39\mathrm{E}(X)=\left(60\cdot\frac{14}{12}\right)+39=109$$