This is only Solution idea. Plz don’t copy paste. Thank you

STA 301

Question 1 (a)

Solution

$$f(x) = 2(x-1) \qquad 1<x<2$$

$$\mu_2^{'} = \int_{-\infty}^{\infty} x^2 f(x)dx$$

$$\mu_2^{'} = 2\int_{1}^{2} x^2 (x-1)dx$$

$$\mu_2^{'} = 2\int_{1}^{2} x^3 - x^2 dx$$

$$\mu_2^{'} = 2[\frac{x^4}{4} - \frac{x^3}{3}]_1^2$$

Apply limits

$$\mu_2^{'} = 2[\frac{(2)^4}{4} - \frac{(1)^3}{3}]$$

$$\mu_2^{'} = 2[\frac{16}{4} - \frac{1}{3}]$$

$$\mu_2^{'} = 2[4 - \frac{1}{3}]$$

$$\mu_2^{'} = 2[\frac{11}{3}]$$

$$\mu_2^{'} = \frac{22}{3}$$

Question 1 (b)

Solution

$$f(x,y)=\frac{x(1+3y^2)}{4} \qquad 0<x<2,\ 0<y<1$$

$$\mathrm{g(x)}=\int_{-\infty}^{\infty} f(x,y)dy$$

$$\mathrm{g(x)}=\int_{-\infty}^{\infty} \frac{x(1+3y^2)}{4}\ dy$$

$$g(x)=\frac{1}{4}\int_0^1 x(1+3y^2)dy$$

$$g(x)=\frac{1}{4}\int_0^1 x(1+3y^2)dy$$

$$g(x)=\frac{1}{4}\int_0^1 x+3xy^2dy$$

$$g(x)=\frac{1}{4}[xy+\frac{3xy^3}{3}]_0^1$$

$$g(x)=\frac{1}{4}[xy+xy^3]_0^1$$

Apply limits

$$g(x)=\frac{1}{4}[x(1)+x(1)^3]-[x(0)+x(0)]$$

$$g(x)=\frac{1}{4}[x+x]-0$$

$$g(x)=\frac{1}{4}(2x)$$

$$g(x)=\frac{x}{2}$$

$$f(x,y)=\frac{x(1+3y^2)}{4} \qquad 0<x<2,\ 0<y<1$$

$$\text{h(y)}=\int_{-\infty}^{\infty} f(x,y)dx$$

$$\text{h(y)}=\int_{-\infty}^{\infty} \frac{x(1+3y^2)}{4}\ dx$$

$$h(y)=\frac{1}{4}\int_{0}^{2} x(1+3y^2)dx$$

$$h(y)=\frac{1}{4}\int_{0}^{2} x+3xy^2dx$$

$$h(y)=\frac{1}{4}[\frac{x^2}{2}+3\frac{x^2}{2}y^2]_0^2$$

$$h(y)=\frac{1}{4}[\frac{x^2}{2}+\frac{3x^2y^2}{2}]_0^2$$

Apply limits

$$h(y)=\frac{1}{4}[\frac{(2)^2}{2}+\frac{3(2)^2y^2}{2}]-[\frac{0^2}{2}+\frac{3(0)y^2}{2}]$$

$$h(y)=\frac{1}{4}[\frac{4}{2}+\frac{12y^2}{2}]-0$$

$$h(y)=\frac{1}{4}[2+6y^2]$$

$$h(y)=\frac{2}{4}+\frac{6y^2}{4}$$

$$h(y)=\frac{2}{4}+\frac{6y^2}{4}$$

$$h(y)=\frac{2+6y^2}{4}$$

$$h(y)=\frac{2(1+3y^2)}{4}$$

$$h(y)=\frac{(1+3y^2)}{2}$$

Question 2 (a)
Solution

$$=\frac{({}^5C_2)({}^4P_2)({}^{48}P_3)}{({}^{52}P_5)}$$

Please do further calculation and get the required answer.

Question 2 (b)

Solution

This question is solved from following formula

$$f(x) = \binom{n}{x} p^x q^{n-x}$$

Attempt yourself.

Wish you Best of Luck.

Remember me in your Prayers