Math 128 Quiz 8 Fall '04

Tue 9

Name:______________________ ID Number:______________________

1. Compute the regression line for the data in the table. Use the regression equation to estimate the value of y that would correspond to $x = 10$.

x	y
3	1
5	1
7	6
8	6

$$y = 1.186440678\,x - 3.322033898$$

at $x = 10$, [crossed out] $y = ((1.186440678)(10)) - 3.322033898 = 8.54237288$

OR, $\sum x_k = 23$, $\sum y_k = 14$, $\sum x_k^2 = 147$, $n = 4$, $\sum x_k y_k = 98$, with $\sum = \sum_{k=1}^{4}$

so, $$a = \frac{n(\sum x_k y_k) - (\sum x_k)(\sum y_k)}{n(\sum x_k^2) - (\sum x_k)^2} = \frac{4(98) - (23)(14)}{4(147) - 23^2} = \frac{70}{59} = 1.186440678$$

$$b = \frac{\sum y_k - a(\sum x_k)}{n} = \frac{14 - (1.18644\ldots)(23)}{4} = -3.322033898$$

2. Evaluate

$$\int_3^4 \left(\int_1^2 \frac{x^2}{1+2y}\,dy \right) dx$$

$$\int_3^4 x^2 \left[\int_1^2 \frac{dy}{1+2y} \right] dx = \int_3^4 x^2 \left[\frac{1}{2} \ln(1+2y) \right]_1^2 dx = \int_3^4 x^2 \left(\frac{1}{2}(\ln 5 - \ln 3) \right) dx$$

$$\frac{1}{2}\ln\left(\frac{5}{3}\right) \int_3^4 x^2\,dx = \frac{1}{2}\ln\left(\frac{5}{3}\right)\left(\frac{x^3}{3}\right)\Big|_3^4 = \frac{1}{6}\ln\left(\frac{5}{3}\right)\left[x^3\right]_3^4$$

$$= \frac{1}{6}\ln\left(\frac{5}{3}\right)(64 - 27) = \frac{37}{6}\ln\left(\frac{5}{3}\right)$$

$$= 3.150091346555694$$

Math 128 Quiz 8 Fall '04

$\boxed{\text{Tue 10}}$

Name:________________________ ID Number:________________________

1. Compute the regression line for the data in the table. Use the regression equation to estimate the value of y that would correspond to $x = 0$.

x	y
3	1
5	2
7	6
8	6

$a = 1.13559322$

$b = -2.779661017$

$y = (1.1356)x - 2.77966$

at $x = 0$,

$y = -2.77966\ldots$

2. Evaluate

$$\int_0^2 \left(\int_0^1 y e^{x+2y} \, dy \right) dx$$

$$= \int_0^2 \int_0^1 e^x y e^{2y} \, dy \, dx = \int_0^2 e^x \cdot \int_0^1 y e^{2y} \, dy \, dx$$

Eval: $\int_0^1 y e^{2y} \, dy = \frac{1}{2} y e^{2y} - \frac{1}{4} e^{2y} \Big]_0^1 = \underbrace{\frac{1}{2} e^2 - \frac{1}{4} e^2}_{\frac{1}{4}e^2} - (0 - \frac{1}{4}) = \frac{1}{4} e^2 + \frac{1}{4}$

$u = y \quad dv = e^{2y}$

$du = dy \quad v = \frac{1}{2} e^{2y}$

$$= \int_0^2 e^x \left(\tfrac{1}{4} e^2 + \tfrac{1}{4} \right) dx = \left(\tfrac{1}{4} e^2 + \tfrac{1}{4} \right) \left[e^x \right]_0^2 = \tfrac{1}{4} (e^2 + 1)(e^2 - 1)$$

$$= \tfrac{1}{4} (e^4 - 1) = 13.39953751\ldots$$

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Tue 11

Name:______________________________ ID Number:__________________________

1. Compute the regression line for the data in the table. Use the regression equation to estimate the value of y that would correspond to $x = 9$.

x	y
2	1
5	1
6	6
8	6

$y = .9\bar{3}x - 1.4$

let $\alpha = .9\bar{3}$

$10\alpha = 9.\bar{3}$

so $9\alpha = 8.4$

$\alpha = \frac{84}{90}$

at $x=9$

$y = \frac{84}{90}(9) - \frac{14}{10}$

$= 8.4 - 1.4$

$= 7$

2. Evaluate

$$\int_0^1 \left(\int_1^2 \frac{xe^{x^2}}{y} dy \right) dx$$

$= \int_0^1 xe^{x^2} \left(\int_1^2 \frac{dy}{y} \right) dx$

$= \int_0^1 xe^{x^2} \left[\ln y\right]_1^2 dx = (\ln 2) \int_0^1 xe^{x^2} dx$

$= \frac{\ln 2}{2} \left[e^{x^2}\right]_0^1 = \frac{\ln 2}{2}(e^1 - 1) \approx .5955111024$