KFUPM | Term 181 | Date: 11/12/2018

Math & Stat Dept. | STAT 319 | Duration: 40 minutes

Class Test #3

Name: ID#: Section #1 Serial

The electric power consumed (Y) each month by a chemical plant is thought to be related to the average ambient temperature (X_1), the number of days in the month(X_2), the average product purity (X_3), and the metric tons of product produced (X_4). The past year's historical data are shown in the table below:

Y	240	236	270	274	301	316	300	296	267	276	288	261
X_1	30	31	45	60	65	72	80	84	75	60	50	38
X_2	24	25	24	25	25	26	25	25	24	25	25	23
X_3	91	90	88	87	91	94	87	86	88	95	90	89
X_4	100	95	110	88	94	105	97	100	110	105	100	98

Answer the two questions below

1. Given that the response variable is Y and the predictor is X_3, answer the following

a. The slope of the regression line =	
b. The intercept of the regression line =	
c. The estimated regression equation is	
d. The error in fitting the electric power consumption for an average product purity of 91	
e. The correlation coefficient between the electric power consumption and the average product purity =	
f. The decision, of testing for a positive linear correlation between the average product purity and the power consumption, is	

P.T.O. ➔

2. Given the Minitab output below, answer the parts that follow

```
Predictor      Coef  SE Coef      T      P
Constant     -33.5            -0.16  0.880
X1          1.0114   0.3701          0.029
X2                    9.412   0.52   0.622
X3           1.764              0.74  0.481
X4                   0.9005  -0.28   0.787

S =           R-Sq = 71.9%   R-Sq(adj) =

Analysis of Variance
Source           DF       SS       MS      F       P
Regression                                    0.041
Residual Error   7
Total                 6572.9

Predicted Values for New Observations

New Obs      Fit  SE Fit        99% CI             99% PI
      1  248.43    8.76  (217.77, 279.09)  (183.87, 312.99)

Values of Predictors for New Observations

New Obs     X1     X2     X3    X4
      1   30.0   24.0   91.0   100
```

a. The slope of the average ambient temperature =	
b. The intercept of the regression equation =	
c. The standard error of the estimate =	
d. A 99% C.I. for the mean electric consumption for an ambient temperature of 30, 24 days in the month, a 91 average product purity, and a 100 tons of product is	
e. The percentage of variation in the power consumption that is explained by the variation in the four predictors accounted for the included number of independent variables and the size of the selected sample =	
f. Testing the significance of all the predictors to the electric power consumption yields a test statistic value =	
g. Testing the significance of all the predictors to the electric power consumption yields a test statistic with degrees of freedom =	
h. Testing the significance of all the predictors to the electric power consumption results in a decision of	

With My Best Wishes

KFUPM | Term 181 | Date: 11/12/2018
Math & Stat Dept. | STAT 319 | Duration: 40 minutes
Class Test #3

Name: ID#: Section #2 Serial

The electric power consumed (Y) each month by a chemical plant is thought to be related to the average ambient temperature (X_1), the number of days in the month(X_2), the average product purity (X_3), and the metric tons of product produced (X_4). The past year's historical data are shown in the table below:

Y	240	236	270	274	301	316	300	296	267	276	288	261
X_1	30	31	45	60	65	72	80	84	75	60	50	38
X_2	24	25	24	25	25	26	25	25	24	25	25	23
X_3	91	90	88	87	91	94	87	86	88	95	90	89
X_4	100	95	110	88	94	105	97	100	110	105	100	98

Answer the two questions below

1. Given that the response variable is Y and the predictor is X_1, answer the following

a. The slope of the regression line =	
b. The intercept of the regression line =	
c. The estimated regression equation is	
d. A 99% C.I. for the mean electric consumption for an ambient temperature of 30 is	
e. The coefficient of determination =	
f. The standard error of the slope of the regression line =	

P.T.O. ➔

2. Given the Minitab output below, answer the parts that follow

```
Predictor      Coef  SE Coef      T      P
Constant     -33.5            -0.16  0.880
X1          1.0114   0.3701          0.029
X2                    9.412   0.52   0.622
X3           1.764              0.74  0.481
X4                    0.9005  -0.28  0.787

S =           R-Sq = 71.9%   R-Sq(adj) =

Analysis of Variance
Source           DF       SS       MS      F       P
Regression                                    0.041
Residual Error    7
Total                  6572.9

Predicted Values for New Observations

New Obs      Fit   SE Fit        99% CI              99% PI
      1   248.43     8.76   (217.77, 279.09)   (183.87, 312.99)

Values of Predictors for New Observations

New Obs     X1     X2     X3    X4
      1   30.0   24.0   91.0   100
```

a. The standard error of the model intercept =	
b. The regression coefficient of the number of days in the month =	
c. The mean squared error =	
d. A 99% C.I. for the electric consumption of a plant with an ambient temperature of 30, 24 days in the month, a 91 average product purity, and a 100 tons of product is	
e. The percentage of variation in the power consumption that is explained by the variation in the four predictors accounted for the included number of independent variables and the size of the selected sample =	
f. Testing the significance of adding the other three predictors to the regression model (with the ambient temperature included) to the electric power consumption yields a test statistic value =	
g. The test in part f has degrees of freedom =	
h. The test in part f results in a decision of	

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