Elementary Statistics

Test 4

December 8, 2010

Name:……..

19+19+20+16+16+2+2+1+1+2+2=100

1. The mean weight of a watermelon produced by an agricultural company is 22 pounds. Watermelons that are too light and dry are less flavorful. A grocery store received a shipment of watermelons from this company. Manager takes a random sample of 26 watermelons and found that the sample mean is 21.2 pounds with a standard deviation of 2 pounds. Test whether this shipment of watermelons has a lower mean weight at 0.01 level of significance.

   H_0:

   H_a:

   LOS:

   Formula and calculation:

   Graph:

   Decision:

2. The average hourly wage last year for members of a certain hospital custodians was $6.32 with a standard deviation of $0.54. This year a sample of 50 custodians had an average hourly wage of $6.51. Test the administration's claim that the average hourly wage has increased at 0.05 level of significance. Assume that the hourly wages are normally distributed. Also find the p-value.

H_0:

H_a:

LOS:

Formula and calculation:

Graph:

Decision:

Decision in terms of the problem:

p-value:

3. Most casts are formed to help protect a broken limb are made from plaster of Paris and cotton wool. Another common type of cast is Polyurethane and fiberglass. This combination of material is quick-setting and light. The most important aspect of any cast, however, is the crush resistance or crush strength. Is there any evidence to suggest that the mean crush strength of plaster of Paris casts is less than the mean crush strength of Polyurethane? Test an appropriate hypotheses at 0.05 level of significance. Also find the p-value.

Group	Sample size	Mean crush resistance strength (in newtons)	Standard deviation
Plaster of Paris	32	210.5	22.5
Polyurethane	32	225.1	18.8

H_0:

H_a:

LOS:

Formula and calculation:

Graph:

Decision:

4. Approximately 25% of the students in Canadian MBA programs are females. Among a random sample of 350 MBA students enrolled in Canadian MBA programs 77 were females. Is there evidence to suggest that the proportion of female students enrolled in Canadian MBA programs is less than 25%. Use 0.01 level of significance.

H_0:

H_a:

LOS:

Formula and calculation:

Graph:

Decision:

p-value:

5.

a. Find the regression line.

b. Find the correlation coefficient.

c. Test $H_0 : a = 0$ against $H_a : a \neq 0$. Use α =0.01. (intercept)

p-value= Decision:

d. Test $H_0 : b = 0$ against $H_a : b \neq 0$. Use α =0.01. (Slope)

p-value= Decision:

e. Find a **95%** confidence interval for the intercept.

f. What is the predicted value of Y when X =10?

SUMMARY OUTPUT

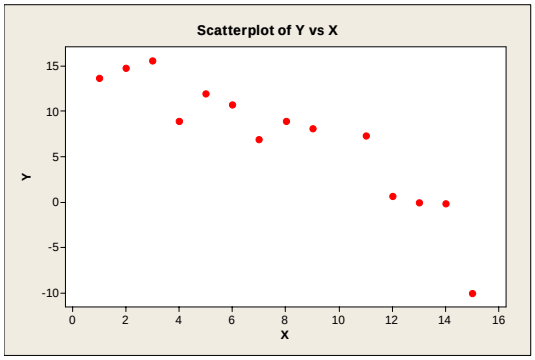
Regression Statistics	
Multiple R	0.767558
R Square	0.589146
Adjusted R Square	0.563467
Standard Error	2.115461
Observations	18

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	102.675	102.675	22.94324	0.0002
Residual	16	71.60278	4.475174		
Total	17	174.2778			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	2.986111	1.086715	2.747834	0.014298	0.682379	5.289843
X Variable 1	0.925	0.193114	4.789911	0.0002	0.515616	1.334384

6. Guess the correlation coefficient between X and Y.



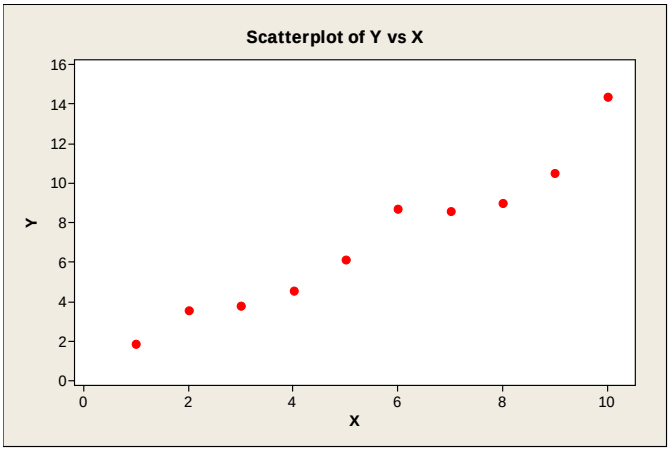
(a) -0.91

(b) -0.24

(c) 0.64

(d) 0.98

7. Use your pencil to fit a line to the data and guess the followings.



a. Y -intercept =

b. Slope =

c. What is the value of Y when X =12?

8. What is the highest value the correlation coefficient can take?

9. If the slope is positive then the correlation coefficient will be _____.

10. Reject the null hypothesis when the p-value is _____ than α .

11. What is the only way to reduce the probability of the two types of errors simultaneously?