Elementary Statistics
Test 4, Fall 2009
Name:……………………………………………….
Select one problem between (2) and (4)   **I select problem #_____**
20+(20)+18+(20)+20+(4+3+2+2+4)+5+2

1   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 :
   $\alpha =$

   Graph (with all the details):

   Test Statistic and Calculation:

   Decision:

   Decision in terms of the problem:

   P-value:

2   Ecological researchers measured the concentration of red blood cells in the blood of 80 field-caught lizards. In addition, they examined each lizard for malarial parasites. Counts are given 10^{-3} cells per mm^3.

Infected Animals	$n_1 = 35$	$\bar{x}_1 = 972.1$	$s_1 = 245.1$
Non-infected Animals	$n_2 = 45$	$\bar{x}_2 = 843.4$	$s_2 = 251.2$

Test whether there is a significant difference in the concentration of red blood cells between the infected and non-infected lizards at 0.05 level of significance. Also find the p-value.

H_0:

H_a:

$\alpha =$

Graph (with all the details):

Test Statistic and Calculation:

Decision:

Decision in terms of the problem:

P-value:

3   A particular drug company claims that its headache remedy stops the average headache in 14 minutes. Being skeptical, you randomly select 25 patients from the outpatient clinic, asking them to take one of these pills when they have a headache and record the length of time (in minutes) until it disappears. The results of your study are $\bar{x} = 18.1$ minutes and $s = 6.9$ minutes. Do the results of your study reinforce or disagree with your skepticism? Use 0.05 level of significance.

H_0:

H_a:

$\alpha =$

Graph (with all the details):

Test Statistic and Calculation:

Decision:

Decision in terms of the problem:

4   In a sample of 80 Americans, 55% wished that they were rich. In a sample of 100 Europeans, 45% wished that they were rich. Is there a difference in the proportions? Use 0.01 level of significance.

Note: Find x_1 and x_2 first.

H_0:

H_a:

$\alpha =$

Graph (with all the details):

Test Statistic and Calculation:

Decision:

Decision in terms of the problem:

P-value:

5   It has been claimed that 30% of all families moving away from California move to Arizona. In a random sample of the records of several large van lines, it is found that the belongings of 104 of 400 families moving away from California were shipped out to Arizona. Test whether the true proportion of families moving away from California move to Arizona is less that 30% at 0.01 level of significance.

H_0:

H_a:

$\alpha =$

Graph (with all the details):

Test Statistic and Calculation:

Decision:

Decision in terms of the problem:

P-value:

6   (a)   Find the regression line.

(b)   Find the correlation coefficient.

(c)   Test $H_0 : b = 0$ against $H_a : b \neq 0$ using 0.05 level of significance.

p-value= _____

Conclusion:_____

(d)   Find a 95% confidence interval for the intercept.

2.1	10.2
3.5	10.8
3.7	8.9
4.2	8.5
5.8	5.1
6.5	5.3

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.921846
R Square	0.8498
Adjusted R Square	0.812251
Standard Error	1.049506
Observations	6

ANOVA

	df	SS	MS	F	Significance F
Regression	1	24.92748	24.92748	22.63124	0.008923
Residual	4	4.405853	1.101463		
Total	5	29.33333			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	14.10149	1.325693	10.63708	0.000442	10.42077	17.78221
X Variable	-1.38794	0.291755	-4.75723	0.008923	-2.19799	-0.5779

7   True/False questions.

   (a) $-1 \le r \le 1$ (True, False)

   (b)   If $a > 0$, then $r > 0$.   (True, False)

   (c)   If $b < 0$, then $r < 0$.   (True, False)

   (d)   Reject H_0 if p-value $< \alpha$.   (True, False)

   (e) X and Y are highly correlated positively means that one variable causes
            the other variable to increase.   (True, False)

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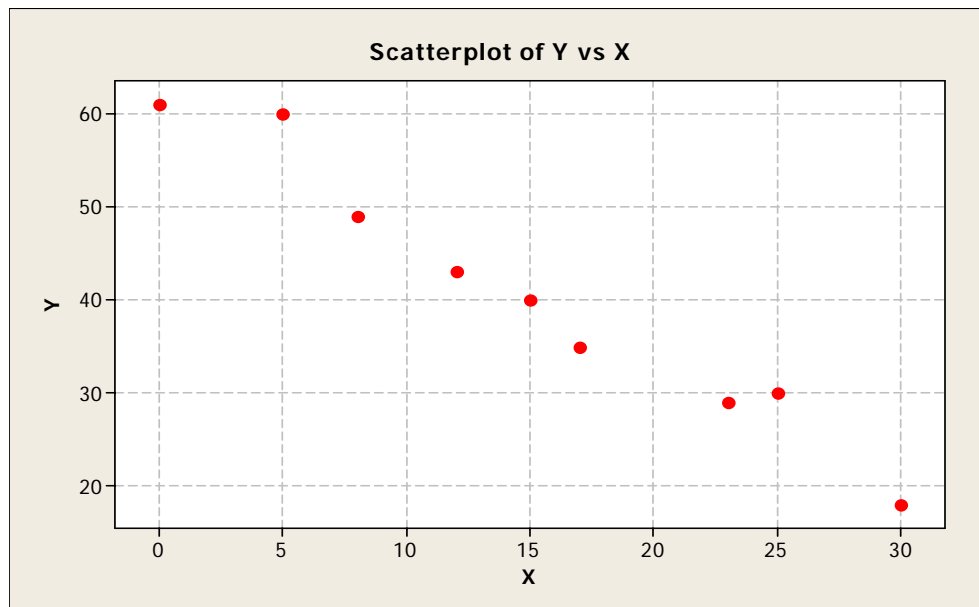
Guess the regression line using the above scatter plot.

(a) $\hat{Y} = 62 - 1.4X$

(b) $\hat{Y} = 62 + 1.4X$

(c) $\hat{Y} = 20 + 1.4X$

(d) $\hat{Y} = 62 - 3.1X$